Vol. 52 ... Part 2 ... Part One ... No. 2

CHEMICAL INDUSTRIES

The Chemical Business Magazine

TECHNOLOGY DEPT.

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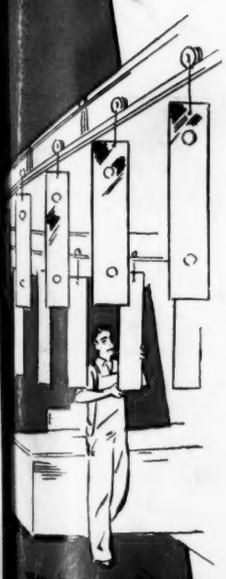

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On the home front . . in factories . . . in the armed services, sanitation is the watch-word. Many Solvay special cleansers and basic alkali products do important war work *by helping keep our armed services fit!*

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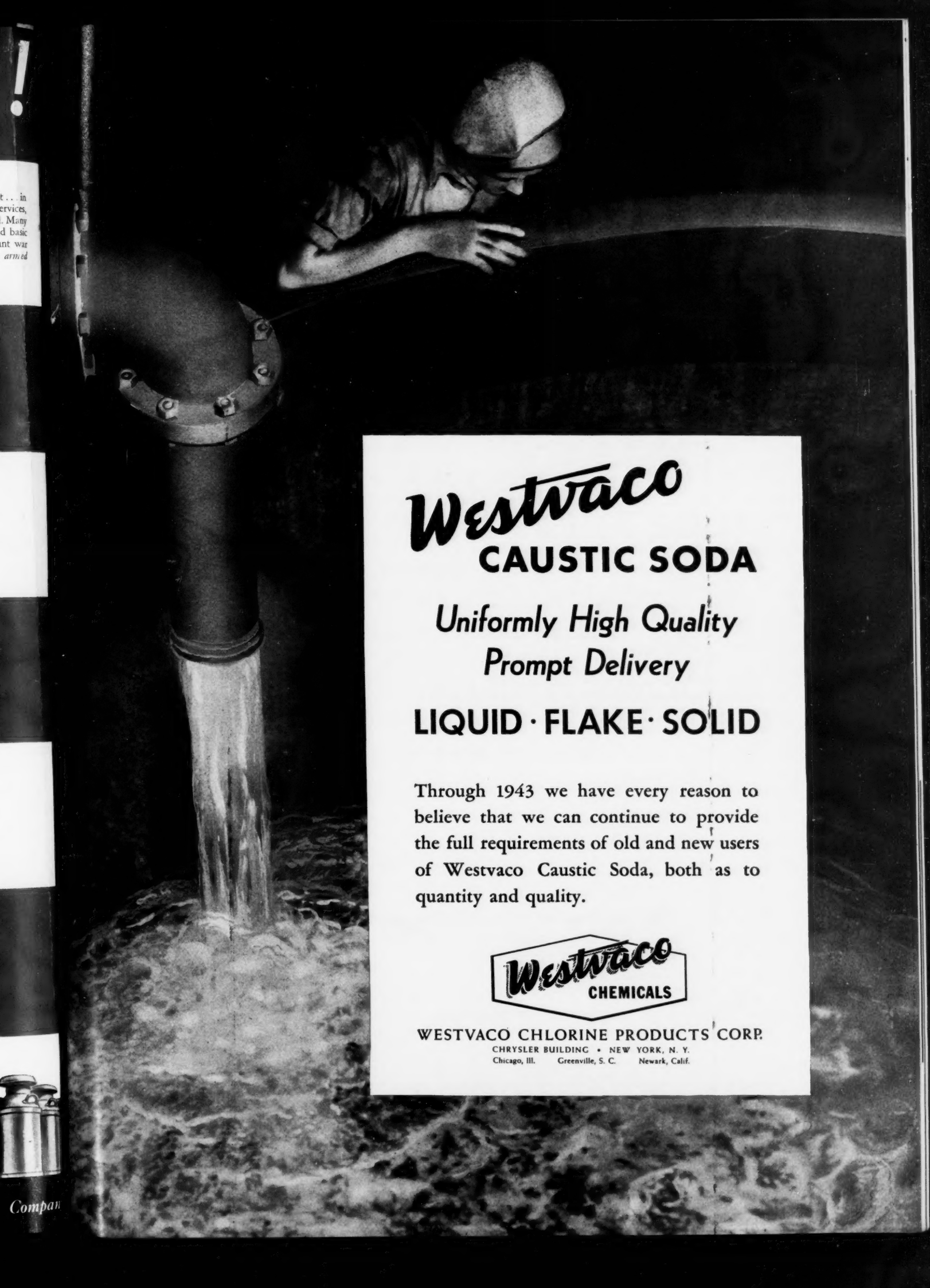
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Through 1943 we have every reason to believe that we can continue to provide the full requirements of old and new users of Westvaco Caustic Soda, both as to quantity and quality.
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The Business Magazine for Makers & Users of Chemicals

Management, Research, Production, Marketing

CHEMICAL INDUSTRIES

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THE CHEMICAL COMPOUND THAT OUTDID

Rip Van Winkle

• Commercially, *sodium chlorite* was asleep for 100 years. It was not until 1941 that it came into its own – when it was first produced in commercial quantities at Mathieson's new chlorite plant at Niagara Falls. Fourteen years of intensive research and practical experimentation by the Mathieson technical staff had preceded the actual construction and operation of the plant.

Long known to chemists by the formula $NaClO_2$, sodium chlorite has unusual oxidizing powers which make it an invaluable bleaching and processing agent. Today sodium chlorite is widely used in the paper and textile industries. It has successfully demonstrated its ability to bleach paper pulp and textiles to high whites without loss in tensile strength – a result that no other known processing agent has been able to achieve. Non-hygroscopic and readily soluble in water, sodium chlorite is highly stable both in solution and in solid form . . . can be heated to 150 degrees C. without decomposition.

Every day this exclusive Mathieson product is finding new applications in American industry – at a time when progress and production are as vital to victory as all-out offensives on the fighting fronts.

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- *Textone* for textiles
- *C2* for paper pulp processing
- *Sodium Chlorite Technical* for general commercial oxidation and processing
- And, of course, the *pure analytical grade* used as a laboratory reagent

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THE READER WRITES

Brazil's Chemical Industry Improved

In 1942 the new developments in organic chemical industry in Brazil have not yet reached the desired position. Some raw materials of first line were missing. However the continuous endeavor of the chemical organization of Santo André, Cia. Qúimica Rhodia Brasileira to investigate and manufacture new organic products must be pointed out. Their acetone and acetic acid industry are among the most important and representative, as an index of our progress.

Probably the most significant happening is that the production of citric acid by fermentation has been started out in S. Paulo. As this industry is important enough to stimulate officially, the Conselho Federal do Comercio Exterior, with the assistance of President Vargas, has approved the efficient measures which might result in the enlargement of the plant producing that acid.

Caffeine industry has taken a large step forward. Using maté as raw material, factories have been established in Santa Catarina, Paraná and São Paulo. The plant of the Departmento Nacional do Café, in which a high amount of that alkaloid should be produced starting from coffee, has not yet begun functioning.

Other basic materials for the caffeine industry existing in Brazil are cocoa and guaraná. Utilizing the first, a factory was established in São Paulo for extracting the theobromine and turning it into caffeine by methylation. The Instituto Central de Formento Econômico da Baía is particularly interested in that use of cocoa. Using certain parts of guaraná plant, trials were made in Amazônia for organizing a local industry of the said alkaloid.

Due to the general demand for flavoring products, the production of essential oils received a strong push forward. In several points peppermint oil which supplies menthol has been cultivated, with an experimental character it is true.

For experimental purposes the terpene portion of orange essence has been removed in order to use it as an industrial solvent.

During 1943 there will certainly be some large progress in the line of organic chemical industry. As it was published, at the coke plant of the Cia. Siderurgica Nacional, in Volta Redonda, the following by-products will be obtained yearly: 3,880,000 liters of benzol, 869,000 liters of toluol and 208,000 liters of xylol.

It is informed that by next June the installations of said coke plant will be in full operation.

This means that such products derived from coal, which are the base of countless chemical industries, will enter the market. So we hope that in 1943 an era of realizations for Brazilian industry of organic chemical products will arrive.

JAYME STA. ROSA,
Editor, Revista De Quimica Industrial,
Rio de Janeiro.

Data Section Appreciated

In my particular case an answer to your letter of December 1st requires something more than a check mark against the list of features appearing in CHEMICAL INDUSTRIES and I am taking the liberty of writing to you personally in this respect.

Being a research chemist I am extremely interested in the "Data Section," since I have invented certain processes for the dyeing of acetate rayon in very fast shades and I am naturally interested in the patents issued as well as the statistical, technical and financial data with respect to possible necessary substitutions due to war regulations. This provides material for further intelligent research.

The *Buyer's Guidebook* is indispensable.

The New Chemicals, Plant Operation and Management and Chemical Specialties sections all form an important source of information in connection with possible future developments in the mind of the research chemist, and to make the picture complete, the balance of CHEMICAL INDUSTRIES furnishes the relaxation of interesting reading which fills in the rest period between problems.

FREDERICK L. YOUNG
Textile Consultant
1206 East 10th Avenue
Hickory, N. C.

Another Testimonial

I don't know where you could improve, as I like and use all of it. Sorry I waited till a year ago to subscribe.

GARRETT B. JAMES
Monsanto Chemical Co.
St. Louis, Mo.

Library Fund

We are again making our annual appeal for funds for the Chemists' Club Library. During a crisis such as the world is now passing through, it might seem that we should discontinue appeals for funds for a scientific library. However, we all know that the winning of the war and our survival in the peace to come depends upon our scientific knowledge and progress, and that we cannot afford to suspend or materially curtail anything which contributes to that scientific progress.

NELSON LITTELL
New York, N. Y.

Conserve Electrodes

One of our readers and contributors, Mr. W. F. Schaphorst writes in to say, "Will your readers stand for a jingle like this." There's only one way to find out. Here it is.

The Ode Of An Electrode

I'm just an electrode, I humbly admit,
But nevertheless I am doing my bit;
Good welders rely on my strength and my grip
For safeguarding cannon, tank, airplane, and ship.
Without me you never will get anywhere,
So please, Mister Welder, conserve me with care.
In storage insist that I'm always kept dry,
Up off the damp floor on a shelf amply high,
Beware sweating pipes, open windows, and such,
I sometimes am rusted by moisture's least touch.
Then if through some mishap I chance to get wet,
Just spread me out quickly. And please don't forget
That I do my best work when I am not bent,
And fit all joints properly 'ere you consent
To do any welding, and then for best strength
Make legs of all fillet welds equal in length,
And, too, make the face of all fillet welds flat.
Since I'm growing scarcer, it's now urgent that
To win in this conflict with gun, plane, and sub,
I'm utilized down to the tiniest stub.
Produce everlastingly! Use me! Don't cease!
We'll then win the war and the right kind of peace.

ZINC CHROMATE GOES TO SEA!

MOST ships that slip majestically down the ways in the increasing crescendo of our naval building program are protected against corrosion with zinc chromate primers. The U. S. Navy and Maritime Commission have recognized the great value of these compounds. The merit of zinc chromate resides not only in its superior corrosion inhibitive properties but also in the fact that by the use of paints containing this pigment, tremendous weights are eliminated, permitting heavier armor and guns, or increased speed.

Zinc chromate primers find extensive application in aircraft construction for Army and Navy use.

The basic chromium chemicals used in the production of zinc chromate and other chrome products for the war, are manufactured by the Mutual Chemical Company of America.

MUTUAL CHEMICAL CO. OF AMERICA NEW YORK, N.Y.

Mutual Chemical Co of America

270 MADISON AVENUE, NEW YORK

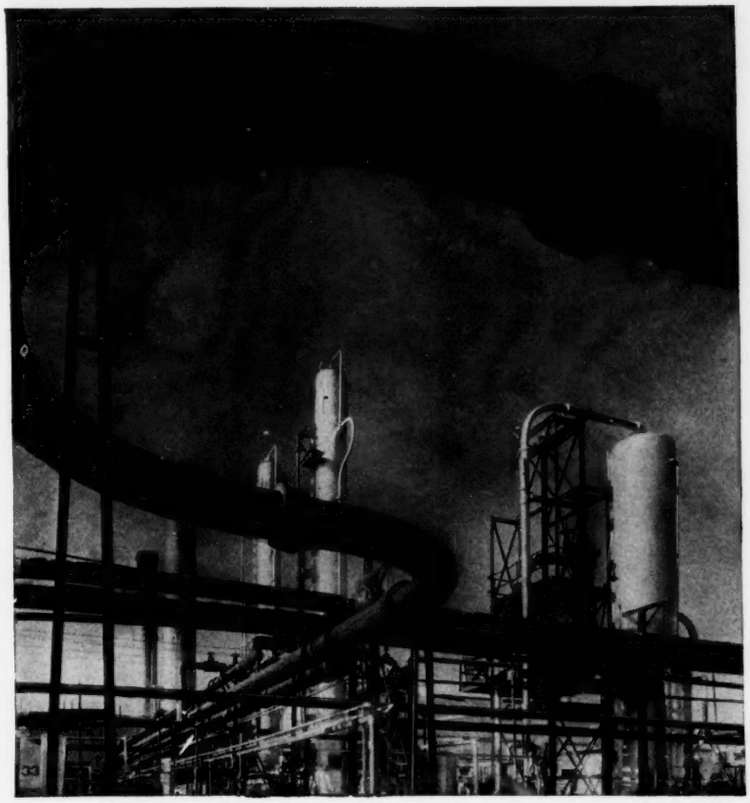
Life On The

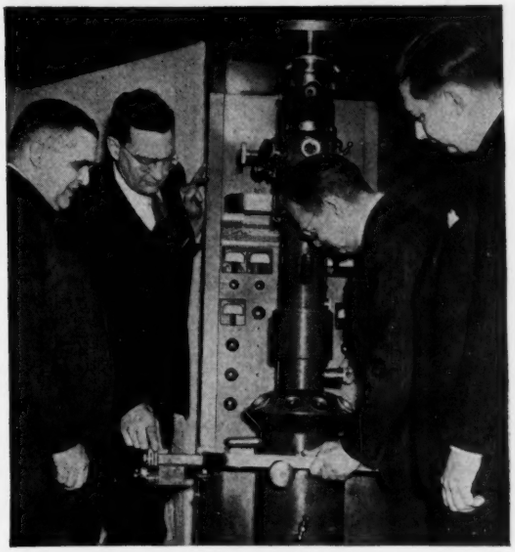
(*Right*) **DUFFLE BAGS FOR THE ARMY** are among the many military items requiring water-repellent fabrics. Timely assistance in meeting these needs is offered by a new Cyanamid development, PARAMUL* 115, an aqueous emulsion of wax and aluminum salts. Because of its fine particle size, PARAMUL 115 is a fluid emulsion, though it has a high concentration of solids. It is stable over a wide temperature range from freezing to tropical heat, and can be stored for long periods. Finish is odorless and meets Government requirements for hydrostatic pressure and spray rating. Preparation for application and application itself are simple.

(*Below*) **NEW SPONGE RUBBER SUBSTITUTE** has been discovered by Dr. H. M. Strong and Dr. Marguerite Naps, during the course of investigations with vegetable oil derivatives being conducted at the Research Laboratories of Bauer & Black, Division of The Kendall Company. Made of lineolic acid, the new material has the unusual property of vulcanizing directly to many surfaces, such as metals and plastics. Its flex-cracking resistance improves at lower temperatures, unlike that of sponge rubber made from the natural material. In many other respects, its properties are almost identical with those of natural rubber. Product is expected to find many uses in war industries and for civilian purposes.

(*Above*) **DECAY-RESISTANT WOOD** is being used to prolong the service life of freight cars. The wood is protected by preservative salts, applied by pressure impregnation process developed by American Lumber & Treating Co. Car shown, destined for service in South America, where life of wooden freight cars is seriously shortened by decay, is believed to be the first single-sheathed car built of treated lumber.

Chemical Newsfront





(*Above*) **SCIENCE AND INDUSTRY** benefit by the research vistas opened by the electron microscope's extraordinary magnifying powers. Shown with the instrument are Dr. C. B. Jolliffe, Chief Engineer of RCA; Dr. Stuart Mudd, Professor of Bacteriology, University of Pennsylvania; Dr. V. K. Zworykin, Associate Director, RCA Research Laboratory; Dr. R. Bowling Barnes, Director of Physics, Cyanamid Research Laboratories. Cyanamid was the first industrial company to utilize the electron microscope for research work.

(*Above*) **THE CATALYST'S THE KEY** to quantity production of aviation gasoline by the refining industry. Modern cracking units need a catalyst of high purity. To meet this demand, Cyanamid is building a new Texas plant at which a synthetic "fluid" cracking catalyst will be produced. This step is a logical outcome of Cyanamid's long experience in the manufacture of catalysts for chemical processes.

(*Right*) **PROTECTION FROM DUST AND SAND** is afforded by this respirator worn by the driver of an Army vehicle taking part in desert maneuvers. *You* can help give this protection by investing in War Bonds or Stamps regularly every payday. Each purchase of a $25 War Bond will provide the funds for furnishing twelve of these respirators for members of the armed forces engaged in desert warfare.

*Trade-Mark

American Cyanamid & Chemical Corporation

A Unit of American Cyanamid Company

30 ROCKEFELLER PLAZA · NEW YORK, N. Y.

*Reg. U. S. Pat. Off.

WASHINGTON

By T. N. Sandifer

WAR plans now going into effect behind censorship will have their impact in the chemical industry and related fields. The effects may not be apparent at once. They will come as blueprints for active military operations this year are translated into physical shapes.

Thus the controversy over the size of the Army, which has not been settled at this writing, will be reflected in manpower requirements, obviously, as the matter is finally determined. Or if it is not settled, the issue will be indicated by perhaps fluctuating statements, as in the past, depending on whether the Army is expected to be larger, or static. Even essential industries, such as the chemical field, should watch so-called "directives" from the War Manpower Commission, or the Selective Service. These bulletins sometimes draw a fine line between occupations, even in essential industries, as to whether the incumbent is a vital employee, or can be replaced after reasonable training of a substitute worker.

T. N. Sandifer

The plan of campaign will be fairly obvious as the orders to industry begin to go out. If the emphasis is to be on air operations, if the air forces are to be continually used on an increasing scale, the fact will show in plans for high-octane gas output. Whether restrictions on materials needed for such production are eased or maintained, may depend on the outlook in the tactical and strategic field. Some decision on this score can be looked for in a hurry.

Chemical warfare preparations are virtually a forbidden topic, but the Army is easing its restrictions to the extent of letting it be known that this country is ready with some surprises for its enemies if gas war is to be in order. The European theatre has furnished no indication to date that either side is about to use gas. There have been veiled hints from German quarters, according to some reports, but these are not taken too seriously unless the Germans resort to gas as a last desperate move. If so, the European picture will change.

In the Pacific, anything can happen. The United States government is formally on record as warning the Japanese that this country will retaliate in kind if gas is used in that war. No gas is officially reported to have been used on American forces. There is fairly definite evidence that it has been used on the Chinese. Hence it is conceivable that this country may first use gas, if at all, in the Pacific.

However this may be, the size of the Army and the tactics to be used, and to some extent the tactics we expect to be used against us, will govern the orders for chemical warfare ingredients in the near future, and the plans for high octane gas, to mention only two aspects of the matter.

CMP Plan

With respect to certain other developments now shaping in Washington the chemical industries so far appear to need have little concern. Officials in the Capital are beginning to draw attention to the Production Requirements Plan in relation to change-over procedure to CMP. CMP affects only metals users to any extent so far, and to the degree that chemical plants use the metals affected, over the stipulated minimums, the industry must watch this. Otherwise, this is a comparative side issue.

A very definite conclusion can be drawn already, in fact. The allotment of the three basic critical metals, steel, copper and aluminum, provide in full for the second quarter of 1943, for high-octane gas, among other things. Incidentally these are the first allotments under CMP (Controlled Materials Plan). In passing it may be noted they provide fully for the synthetic rubber program, also.

There are indications that it is to be extended to include other materials, but until this list is announced there is no occasion for any disturbance in this industry. Meanwhile, for the benefit of those who are directly affected at present, the CMP (Controlled Materials Plan) has been substantially modified as to certain paperwork requirements, and allotments of the metals involved will be made on a quarterly instead of a monthly basis as heretofore.

Another matter, the so-called "task committees" now being formed for various industry groups in Washington, are just sub-committees after all, under a more glamorous name. Those most active in collateral industry fields so far are concerned with transportation, primarily in cosmetic materials, etc.

Alcohol Plants

Still in negative vein, the vast program of alcohol plants (government-sponsored) on paper apparently will remain just a paper precautionary measure. Materials will be hard to get, labor likewise, and time still more so. Therefore the criterion on that matter apparently is what is to be done about rubber. Proponents of processes using alcohol, as distinct from petroleum processes are active again. There is agitation over the supplies of alcohol now accumulating. However, the idea has potentialities for the year.

One situation growing tighter each week is in containers. Eleven chemicals are barred from packing in steel drums effective March 1, under an amendment to L-197. On the other hand, certain substitute containers having proved unsatisfactory for the particular products listed, a number of the latter chemicals are now restored to eligibility for packing in steel drums.

With reference to two recent discussions in "Between the Lines" on fluorspar and plastics, the first-named has been taken under control as to shipments and uses, as of January. Five new producers are expected to come in during the year adding about 60,000 tons to the visible supply. On the second subject, plastics, the Chemicals Division has acted to encourage pooling in the molded plastics industry's machinery, technical knowledge and other resources, to increase the facilities for meeting military needs.

Two appointments since this department last appeared deserve mention; Dr. Ernest W. Reid who has headed the Chemical Division for some time, has been moved up to deputy director general for the industry Division of WPB. He is succeeded by Dr. D. P. Morgan as chief of Chemicals.

(*Continued on page 138*)

the Promise OF AMERICA

America has always been a land of promise, but never more so than today. In the past it has been mainly a promise to individuals seeking freedom and opportunity. Today it is a promise to nations. For in the freedom of the individual we have found the way by which nations may become strong and free, not at the expense but to the benefit of other nations.

Niagara has always been an expression of America's great resources and unlimited opportunities. It is also a symbol of friendship and cooperation because its power and beauty are shared equally with a country that has grown and prospered and remained free as a neighbor of America. Here is the vision and the substance of Democracy—the proof of history that decency among nations is as fruitful as decency among men. It is also proof of the fact that mutual respect is a source of self-respect and a basis for the lasting peace for which all nations hope.

We who work within sight and sound of Niagara Falls are devoting every ounce of our energies and facilities to speeding the flow of chemicals for Victory.

CAUSTIC POTASH · CAUSTIC SODA
PARA · CARBONATE OF POTASH
LIQUID CHLORINE

FROM THE ORIGINAL BY JOHN S. DeMARTELLY . . . IN NIAGARA ALKALI COMPANY'S COLLECTION OF PAINTINGS OF NIAGARA FALLS

NIAGARA ALKALI COMPANY

Niagara **ALKALI COMPANY**

60 EAST 42nd STREET, NEW YORK, N. Y.

An Essential Part Of America's Great Chemical Enterprise

LAST MINUTE NEWS AT PRESS TIME DIGESTED FOR C.I. READERS

CHEMICAL INDUSTRIES

CHEM-O-GRAM

WASHINGTON PRICES PRODUCTION PERSONNEL

RUBBER STOCKPILE AHEAD OF FORECASTS

WASHINGTON, Feb. 13—Country's rubber stockpile is holding up better than predicted by the Baruch Committee. However savings of approximately 40,000 tons in final six months of 1942, compared with committee estimates, is too small to be major factor in solving rubber problem. Key to problem is, according to officials, completion of facilities to expedite the synthetic program; completion of 43.6% of Buna S program by mid-July is assured. Availability of crude from sources which Baruch Committee feared might be lost to Japanese has increased our stockpile.

PAPER GOES TO WAR

NEW YORK, Feb. 15—The Technical Association of the Pulp and Paper Industry in its Paper Prevents Bottlenecks Exhibit at the Hotel Commodore showed how essential paper is in wartime. The War Dept., airplane manufacturers, paper manufacturers, paper converters displayed a comprehensive selection of pulp, papers, and paperboard products used to conserve critical metals, rubber, shipping space, and weight.

PAPER TECHNOLOGISTS ELECT OFFICERS

NEW YORK, Feb. 15—TAPPI at its 28th national technical meeting re-elected Ralph A. Hayward, president and general manager of Kalamazoo Vegetable Parchment Co., as its president for this second year of the war. To serve with Mr. Hayward, Vance P. Edwardes, International Paper Co., was re-elected vice president.

MIDWEST POWER CONFERENCE IN APRIL

CHICAGO, Feb. 13—Sponsored by Chicago sections of American Institute of Chemical Engineers, American Institute of Electrical Engineers, American Institute of Mechanical Engineers, American Society of Mechanical Engineers, Illinois sections of the American Society of Civil Engineers, American Society of Heating and Ventilating Engineers, Western Society of Engineers, and Engineers' Society of Milwaukee, the 17th annual meeting of Midwest Power Conference will be held April 8 and 9 in Chicago. Listing thirteen speeches in the preliminary program, the general topics for discussion sessions include: central station practice, electrical distribution, diesel power, fuels and combustion, and industrial power plants and their protection and maintenance. C. W. Kellogg, president of Edison Electric Institute, will deliver the keynote address, "Electric Power Supply." At the All-Engineers dinner, Col. James L. Walsh, director and trustee of army ordnance department, will discuss "Logistics, the Science of Survival."

KIDDE DIES

Walter Kidde, 65, engineer, manufacturer, and civic leader, died suddenly at his home in Montclair, N. J. Feb. 9. Mr. Kidde was founder and president of Walter Kidde & Co., manufacturers of life-saving and fire extinguishing apparatus. As president of Walter Kidde Constructors, Inc., he directed the construction of the New York approach to the George Washington Bridge; Castle Village on Riverside Drive in N. Y.; the great shipyards at Port Newark and Kearny, N. J.; and many of the buildings of the Brooklyn Navy Yard. As member of the N. J. State Highway Commission, he helped design and construct the Pulaski Skyway. Mr. Kidde was vice president of the N. J. Welfare Council, member of the N. Y. State Chamber of Commerce, president of N. J. State Chamber of Commerce, appointed by President Roosevelt as member of a three-man Advisory Committee for the State of New Jersey on Public Works Organization, and fellow of the American Society of Mechanical Engineers. He was also president of Walter Kidde & Co. of Canada, Limited, Walter Kidde & Co., Limited of London, Bloomfield Tool Co., N. J. and vice president of the Church Publishing Ass'n.

LAST MINUTE NEWS AT PRESS TIME DIGESTED FOR C.I. READERS

CHEMICAL INDUSTRIES
CHEM-O-GRAM

WASHINGTON PRICES PRODUCTION PERSONNEL

MINING ENGINEERS MEET

NEW YORK, Feb. 14—Speaking at the annual dinner of the 158th meeting of the American Institute of Mining and Metallurgical Engineers held this week, William M. Jeffers discussed "Transportation," and John Robert Suman, Humble Oil and Refining Co., received the Anthony F. Lucas Gold Medal "for distinguished achievement in improving the technique and practice of producing petroleum." Earlier in the sessions Dr. Harvey N. Davies, president of Steven Institute of Technology and director of scientific research and development of WPB in Washington, addressed the Institute on the subject of "Metals and the War," covering some of the problems presented to his department. Paul D. Merica, vice president of International Nickel, and Essington Lewis, Director General of Munitions and Aircraft Production for Australia, were presented with certificates of honorary membership in the Institute, highest of its honors. The annual Institute of Metals lecture was "Applications of the Electron Microscope in Metallurgy" delivered by Valdimir K. Zworykin, associate director of RCA laboratories.

A. S. T. M. TO HOLD SPRING MEETING

PHILADELPHIA, Feb. 11—Outstanding authorities in the field of powder metallurgy and paints and paint materials will present technical papers and discussions in two technical symposiums during the 1943 spring meeting of the American Society for Testing Materials being held in Buffalo, at the Hotel Statler, March 3. Beginning March 1 Committee Week will be in progress during which meetings involving standardizing of specifications and tests for engineering materials and extensive research programs will be held. Among the technical committees which will meet are: Subcommittees of Committee A-3 on Cast Iron; Committee A-6 on Magnetic Properties; Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel, and Related Alloys; Committee B-3 on Corrosion of Non-Ferrous Metals and Alloys; Committee B-7 on Light Metals and Alloys, Cast and Wrought; Committee D-1 on Paint, Varnish, Lacquer, and Related Products; Committee D-5 on Coal and Coke; Committee D-11 on Rubber Products; Sections of Committee E-1 on Methods of Testing; Advisory Committee on Corrosion.

KINSMAN NAMED TO PROTTO'S POST

WILMINGTON, DEL., Feb. 7—J. Warren Kinsman has been appointed assistant general manager of Organic Chemicals Dep't of du Pont to succeed the late Cesare Protto. Mr. Kinsman, who has been assistant general manager of the plastics dep't since August, 1941, formerly was director of sales for intermediates and exports and manager of the alcohol division of the organic chemicals department. He joined the company in 1915 in the High Explosives Operating Dep't at Bayway.

SYNTHETIC RUBBER PLANT

CLEVELAND, Feb. 8—General Tire & Rubber Co. and General Latex and Chemical Corp. have contracted with the government to operate a synthetic rubber plant in the southwest. Butadiene for the plant will be provided by Humble Oil Co., whose buildings are located in the same town. Both synthetic and butadiene plants are scheduled for completion in June of this year.

STINE TALKS TO CHEMICAL ENGINEERS

NEW YORK, Feb. 7—Speaking before a joint meeting of the American Institute of Chemical Engineers and the Junior Chemical Engineers, Dr. Charles M. A. Stine, vice president in charge of research and development, E. I. du Pont, will discuss "Training and Responsibilities of Administration in Chemical Industry." Meeting will be held Feb. 24 at 2 Park Avenue.

I hear Blaw-Knox builds these Process Plants

Yes—complete from idea to operation

Whatever your Process—depend on Blaw-Knox to do the whole job. Research, engineering, fabrication, erection, initial operation—all under the single guarantee and single responsibility of Blaw-Knox!

BLAW-KNOX DIVISION OF BLAW-KNOX CO.
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Complete plants or equipment for the following processes . . .

Distillation
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Evaporation
Crystallization
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Mixing and Stirring
Organic Synthesis
Emulsification
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Impregnating
Gas Cleaning
and others

BLAW-KNOX builds complete PROCESS PLANTS

No large industry ever became large overnight. They all, like the oak from the acorn, started in a small way. Why not give

Furfural

an opportunity to show what it can do for you. Due to its essentiality to the war effort, large quantities are not available, but it is possible to obtain sufficient quantities to do research or even pilot plant experimentation.

Large scale uses such as the refining of lubricating oil and wood rosin, plastics manufacture, and abrasive wheel manufacture all prove that Furfural will do the BEST job when put in the right place. Questions regarding any of the properties or applications of this versatile aldehyde are welcome. Let us show you how it may be applied to your business. Write for information today.

The Furans

FURFURAL

FURFURYL ALCOHOL

TETRAHYDROFURFURYL ALCOHOL

HYDROFURAMIDE

TYPICAL PROPERTIES

Specific gravity (20/20)	1.161
Freezing point	—37°C.
Boiling point	157-167°C. (99%)
Flash point (open cup)	56°C.
Refractive index (20/D)	1.5261
Viscosity at 38°C. (Centipoises)	1.35

Write for this Free Booklet

The Quaker Oats Company

TECHNICAL DIVISION 3-2 CHICAGO, ILLINOIS

FURFURAL - FURFURYL ALCOHOL - HYDROFURAMIDE
... TETRAHYDROFURFURYL ALCOHOL ...

Washington

(*Continued from page 136*)

The second appointment is that of Lawrence A. Appley, vice president of Vick Chemicals, to be executive director of the War Manpower Commission.

Labor Supply Drops

According to a recent report from the Census Bureau the civilian labor force dropped to 52,400,000 last month, a wartime low, largely because of entrance of men into the armed services.

The figure was 1,000,000 below December with decreases in both employment and unemployment.. The number of employed persons dropped from 51,900,000 in December to 51 million in January, while unemployment fell from 1,500,000 to 1,400,000.

The Census Bureau said that January estimates emphasized these labor force trends that have been developing during the past year:

"1. The steadily changing composition of the labor force to include higher proportions of women.

"2. The almost complete exhaustion of male labor reserves."

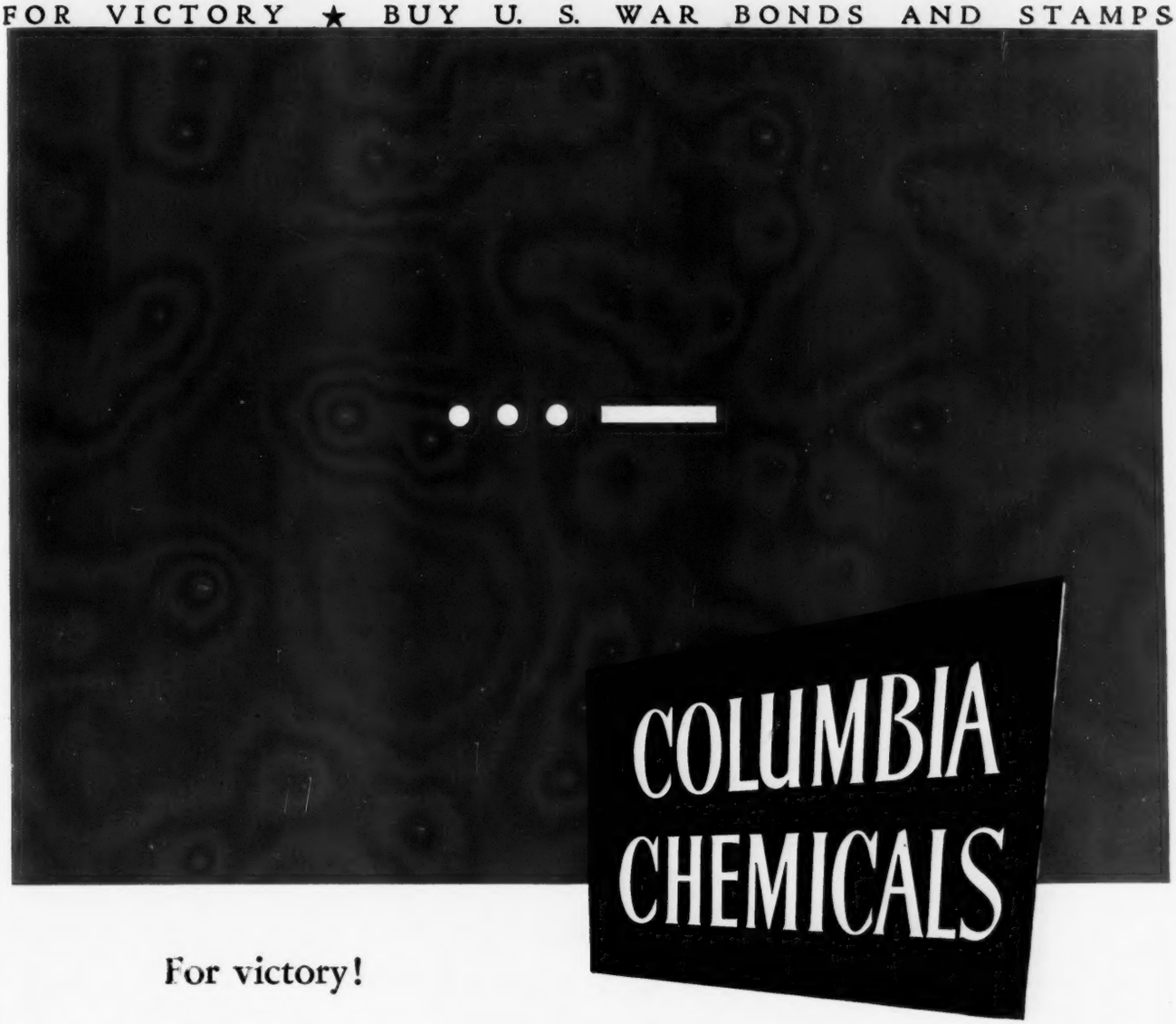
Scientific Roster Reports

Detailed information concerning the qualifications of more than 500,000 of the Nation's scientists and professional men and women has been catalogued by the National Roster of Scientific and Specialized Personnel and over 140,000 names have been certified to agencies engaged in the war effort, according to a report released by the National Resources Planning Board. Not only have the various war agencies received the names of thousands of individuals for full time positions, but they have also obtained the services of many scientific leaders to serve as consultants for short periods of time.

In cooperation with the Selective Service System, the roster is continuing the task of completing the registration of all men from 18 to 65 years of age who have scientific or professional training or experience. Many of the most eminent scientists of America have collaborated in devising classification methods which can produce from a central register any desired combination of scientific skills within a few hours' time.

The report says: "Trained personnel is a national resource indispensable to the prosecution of the war. In a period such as the present, which witnesses an emergency expansion of America's armed forces, America's industry, and America's governmental structure, it is obvious that the national interest will be advanced by the use of every appropriate measure to make proper contact between the right man and the right job."

FOR VICTORY ★ BUY U. S. WAR BONDS AND STAMPS



For victory!

Victory—complete victory, at the earliest possible moment! Nothing short of that will satisfy American Industry.

That's why the tempo of industrial production has increased so rapidly. That's why new production records are so commonplace today they scarcely merit a moment's attention. That's why supplies and equipment for our armed forces are pouring out of our factories in a veritable deluge—a deluge which will inevitably overwhelm our enemies.

In this war production program, Columbia Chemicals are playing a vitally important role, helping to increase production, helping to make sure that finished products will provide the dependable performance so necessary in all types of war equipment.

If the pressure of expanded wartime schedules has created a production problem in your plant, involving the use of chemicals such as those listed here, why not let us discuss it with you on the chance that we might be able to make a suggestion or two which will be of benefit.

COLUMBIA Essential Industrial CHEMICALS

SODA ASH · CAUSTIC SODA · SODIUM BICARBONATE · LIQUID CHLORINE · SILENE* · CALCIUM CHLORIDE
SODA BRIQUETTES · MODIFIED SODAS · CAUSTIC ASH · PHOSFLAKE · CALCENE** · CALCIUM HYPOCHLORITE

*Precipitated Calcium Silicate **Precipitated Calcium Carbonate

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"S & W" Congo Gum

TODAY,

with our spot stocks good, and additional supplies available, "S & W" Congo Gum is an important material. In addition to its many uses in protective coatings — where it has been a basic material for a number of years — Congo Gum is now finding favor in new fields where its properties have satisfactorily replaced critical materials.

"S & W" Congo Gum is available in processed form — pure, modified and esterified — manufactured by us to meet exacting specifications. For those users who are in a position to do their own processing, we have the raw type, graded as to color, hardness and cleanliness. Some of the more important uses for "S & W" Congo Gum are:

THE COMPLETE RESIN LINE

"S & W" ESTER GUM—*all types*
"AROFENE"—*pure phenolics*
"AROCHEM"*—*modified types*
"CONGO GUM"—*raw, fused and esterified*
"AROPLAZ"*—*alkyds*
NATURAL RESINS—*all standard grades*
*Reg. U. S. Patent Office

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Specify HEYDEN

Glycerophosphates

A complete group of the official and non-official compounds of Ortho-Glycerophosphoric Acid

CALCIUM GLYCEROPHOSPHATE N. F.
Powder

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Powder

MANGANESE GLYCEROPHOSPHATE N. F.
Powder

MAGNESIUM GLYCEROPHOSPHATE
Powder

POTASSIUM GLYCEROPHOSPHATE
50% and 75% Solutions

SODIUM GLYCEROPHOSPHATE N. F.
Crystals and Powder

SODIUM GLYCEROPHOSPHATE
50% and 75% Solutions

GLYCEROPHOSPHORIC ACID
25% Solution

Write for Current Products List

HEYDEN CHEMICAL CORPORATION

NEW YORK · 50 UNION SQUARE

Chicago · 180 No. Wacker Drive

Wyandotte

Announcing the consolidation of

MICHIGAN ALKALI COMPANY

THE J. B. FORD COMPANY

into

WYANDOTTE CHEMICALS CORPORATION

Back in the 1890's, two companies were established in Wyandotte, Michigan, by Captain John B. Ford, father of the plate glass industry in America, and an outstanding pioneer in the chemical industry.

The Michigan Alkali Company grew to be one of the great basic chemical companies of the world, manufacturing a wide range of products serving more than fifty different industries.

The J. B. Ford Company developed into the world's largest manufacturer of specialized cleaning materials, and an important factor in promoting sanitation and safeguarding the health of America.

The company controls warehouse facilities strategically located at approximately 200 points throughout the country.

Consolidation a Logical Step

On January 1, 1943, these companies were consolidated, still under the same family ownership, to form the Wyandotte Chemicals Corporation.

This consolidation is a logical recognition of the close relationship which has existed between the companies for many years.

Management and personnel will remain the same, but the consolidation will offer an opportunity for even greater service to our customers.

Many Benefits to Customers

Wyandotte Chemicals Corporation will continue to have one of the best distribution systems in the United States—making all Wyandotte products more readily available, to smaller as well as larger consumers.

Combining the technical staffs of the two companies will now make it possible to bring a wider range of expert technical service to Michigan Alkali and The J. B. Ford customers everywhere.

The enlarged research laboratories may be counted upon to develop important new products to meet the needs of war and post-war conditions.

And by the complete integration of the ownership of raw material sources and control of manufacturing and distribution *in the one company*, Wyandotte Chemicals Corporation will be able still further to enhance the *quality* and *value* for which Wyandotte products have long been noted.

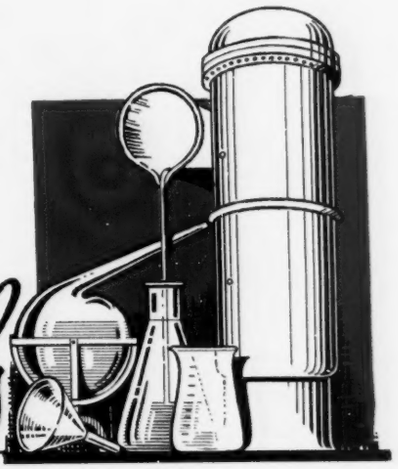
Contracts and commitments of Michigan Alkali Company and The J. B. Ford Company in force at the end of the year 1942 will be carried out without interruption by the Wyandotte Chemicals Corporation, and customer contacts will be maintained without interruption by the Michigan Alkali Division and the J. B. Ford Division of the consolidated sales departments.

It is our sincere intention to continue to develop and manufacture to the best of our ability products which help the nation in wartime and which will contribute to a fuller life when peace is won.

WYANDOTTE CHEMICALS CORPORATION

Michigan Alkali and J. B. Ford Divisions

Wyandotte, Michigan



Chemicals FOR SYNTHETICS

Stauffer serves many of the leaders in the synthetics industry — synthetics that serve humanity better than the products they replaced — synthetic rubber, plastics, rayon and the like — that are at present making great contributions to assure victory, and possessing unlimited possibilities for new and useful applications when the peace comes.

Consider Stauffer as a source of supply for your chemical requirements.

STAUFFER PRODUCTS

Borax
Boric Acid
Carbon Bisulphide
Carbon Tetrachloride
Caustic Soda
Citric Acid
*Commercial Muriatic Acid
*Commercial Nitric Acid
*Copperas
Cream of Tartar
Liquid Chlorine
Nitrate of Potash
Silicon Tetrachloride
Sodium Hydrosulphide
Stripper, Textile
*Sulphate of Alumina
Sulphur
Sulphuric Acid
Sulphur Chloride
*Superphosphate
Tartaric Acid
Titanium Tetrachloride
Tartar Emetic

*Items marked with star are sold on West Coast only.

Stauffer INDUSTRIAL CHEMICALS SINCE 1885

Attend the 18th Annual Drug, Chemical and Allied Trades Dinner to be held at the Waldorf-Astoria on Thursday, March 4.

420 Lexington Avenue, New York, N. Y.
230 North Michigan Avenue, Chicago, Ill.
624 California Street, San Francisco, Cal.

STAUFFER CHEMICAL COMPANY

555 South Flower Street, Los Angeles, Cal.
424 Ohio Bldg., Akron, O. — Apopka, Fla.
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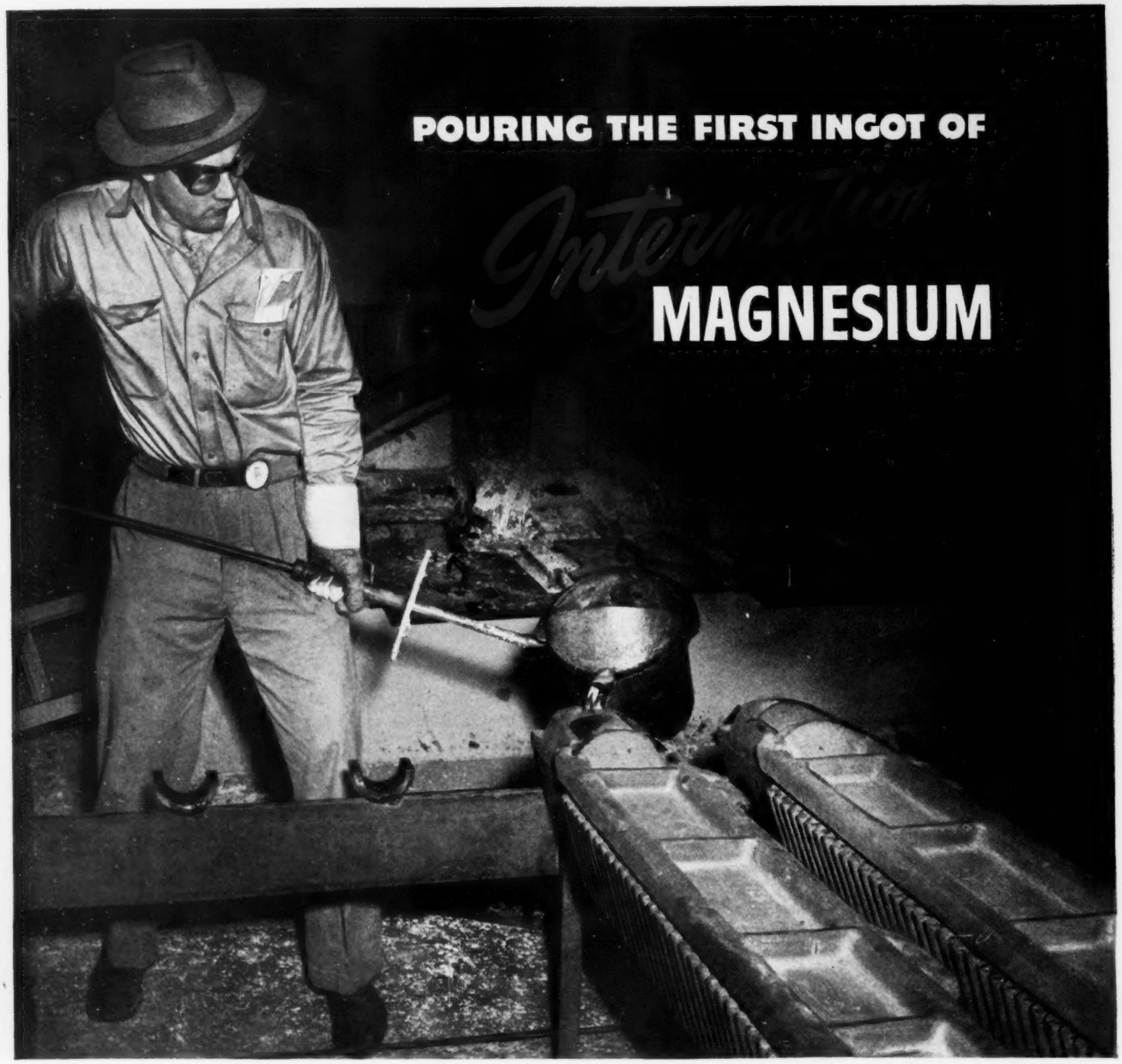

International is proud to report that it is now producing magnesium, the light metal that is giving victorious speed and stamina to America's fighting planes. Gleaming ingots of magnesium are now pouring out in a swiftly swelling flood from the huge plant International has built and is operating for the Government. International's Magnesium now enters the fight along with the phosphate, potash, fertilizers and chemicals which International is producing—all as essential for war as they are indispensable to industry and agriculture in times of peace.

MAGNESIUM FROM POTASH ORE

At its potash mine in New Mexico, International is producing langbeinite (a potassium magnesium sulphate) and muriate of potash (potassium chloride). In processing these potash ores, International obtains large amounts of magnesium chloride, one of the essential raw materials required for making magnesium metal. *International Minerals & Chemical Corporation, General Offices: 20 North Wacker Drive, Chicago.*

International

MINERALS AND CHEMICALS

Mining and Manufacturing

PHOSPHATE • POTASH • FERTILIZER • CHEMICALS

Plastics begets its newest child . . . synthetic rubber

Under the impelling influence of war, the full meaning of plastics is bursting upon the public in all its dazzling ramifications.

To people who think of plastics as telephone sets, radio cabinets, and automobile gadgets, it comes as a surprise that nylon stockings are made of *thread-like* plastics . . . that some of the finest modern paints are *liquid* plastics . . . and that synthetic rubber is just an *elastic* plastic.

The *hard* plastics, the *thread-like* plastics and the *liquid* plastics have created vast fields for this newest of industries. Now the *elastic* plastics are opening up new vistas. Army tanks, jeeps and many other American weapons will be riding on synthetic rubber and eventually, the American motorist will find this product freeing him of rationing shackles.

The supplying of materials for plastics is one of Koppers' many war jobs. Koppers is making airplane catapults, anti-aircraft gun mounts, airplane, submarine and automotive piston rings, pitch coke to speed aluminum production, coke plants to increase steel production and dozens of other products.—Koppers Co., Pittsburgh, Pa.

Coal has long been the chief source of plastics intermediates, the basic materials being tar acids, light oils, naphthalene, etc. Coal is also one of the chief sources of some of the most important ingredients of synthetic rubbers . . . including styrene, made from benzene, which is combined with butadiene in the manufacture of the buna-S synthetic rubbers. Coal tar products, such as cresyl phosphates and various phthalates, are used as softeners and plasticizers; coal tars and tar oils are themselves rubber softeners. Koppers recovers and supplies these raw materials for the manufacture of materials for plastics and synthetic rubber. It also developed the first large-scale American supply of ammonium thiocyanate, which is finding uses in this field.

Buy United States
War Bonds and Stamps

KOPPERS

THE INDUSTRY THAT SERVES ALL INDUSTRY

A New Name

INLAND STEEL-CONTAINER CO.

formerly

WILSON and BENNETT MFG. COMPANY

Operating under the same management installed by the Inland Steel Company several years ago.

INLAND STEEL CONTAINER CO.

Formerly WILSON & BENNETT MANUFACTURING COMPANY

6532 S. MENARD AVE. CHICAGO, ILLINOIS

Plants at Chicago—Jersey City— New Orleans—Richmond, Calif.

Sales offices in all principal cities

CONTAINER SPECIALISTS

Acid-Proof **PIPE** *for every purpose*

Knight-Ware acid proof chemical pipe is being effectively used in a great variety of places where resistance to acids, alkalies, gases and fumes is vital.

The small bore, liquid carrying pipe is extensively used in chemical industries for carrying processing acids and waste liquids containing corrosive elements. Larger sizes of Knight-Ware pipe, used for carrying chemical vapors and gases are frequently tailor-made to fit an existing laboratory or industrial layout. Of timely interest is the fact that Knight-Ware bell and spigot piping requires no metal for the joints.

Knight-Ware piping is one of countless chemical stoneware items made for laboratories and industrial plants. Tell us your needs and our engineers will try to give you a practical solution.

MAURICE A. KNIGHT
202 Kelly Ave., Akron, Ohio

AMERICA'S NEW VICTORY HIGHWAY RUNS ENTIRELY UNDERGROUND!

Through cornfields and woods, crossing railroads, rivers, highways and hills, goes one of the world's greatest high-speed, non-stop transportation arteries – underground all the way. It's America's brand new oil express highway – the largest capacity oil pipeline ever built. It is expected to relieve our national oil shortage with the delivery of 9,000,000 barrels a month.

When it is completed, the new line will be a 1500-mile underground tunnel of steel pipe reaching all the way from Texas to the eastern seaboard. In the construction of the first 530-mile leg, which stretches from Texas to Illinois, War Emergency Pipelines, Inc., smashed all records for speed . . . and every mile of that pipe has been coated with Barrett Enamel.

★ ★ ★ ★

Barrett Enamel is only one of hundreds of basic products manufactured by Barrett. In the chemical industry as in the pipeline industry, Barrett products are being supplied in increasing quantities to meet essential wartime requirements.

If deliveries of Barrett Chemicals for civilian use are delayed or curtailed, it is because so many Barrett basic products are helping to speed America's weapons of war. Barrett's vast facilities and 89 years of manufacturing experience are being utilized to keep production at top limits.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK

BARRETT COAL-TAR CHEMICALS: Tar Acids: Phenols, Cresols, Cresylic Acids • Naphthalene • Phthalic Anhydride *Cumar (Paracoumarone-Indene Resin) • Rubber Compounding Materials • Bardol* • Barretan* • Pickling Inhibitors Benzol • Toluol • Xylol • Solvent Naphtha • Hi-Flash Solvent • Hydrogenated Coal-Tar Chemicals • Flotation Agents Tar Distillates • Anhydrous Ammonia • Sulphate of Ammonia • Arcadian*, the *American* Nitrate of Soda

Barrett

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*REG. U. S. PAT. OFF.

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THURSDAY EVENING, MARCH 4th, 1943

THE WALDORF-ASTORIA
NEW YORK, N. Y.

Tickets, $10.00 per person Tables of ten — $100.00

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DRUG, CHEMICAL AND ALLIED TRADES SECTION
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"A Full House means A Full Purse
For a Worthy War Charity!"

—●—

Early reservations are suggested as table locations are assigned in order of receipt.

Write or 'phone
JOHN C. OSTROM, *Secretary*
41 Park Row, New York City
Telephone: COrtlandt 7-1413

What every plant operator should know about GLASS PIPING!

WHAT DOES GLASS *PIPING* COST?

A: Initial cost is low. Briefly, PYREX Piping (accessories included) costs about the same or less than full-weight copper or brass piping and considerably less than stainless steel. For example, the plant engineer of the textile plant pictured at the right said the initial cost of his PYREX Piping was about ⅓ the cost of his previous piping.

Users report very low long-term cost. In the first place, PYREX Piping does not wear out under acid attack. Its service life is long and trouble free. The line in the top photograph, for example, has withstood 8 years of severe service, without a cent for maintenance. In the second place, you see *inside* PYREX Piping. This *visibility* cuts down costly disassembly, makes cleaning easy, and forestalls product contamination and resulting expense. The operator in the bottom photograph can see his product inside his lines.

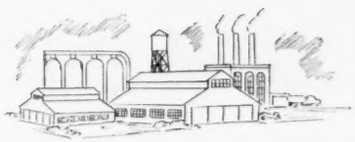
These advantages add up to good service . . . for a long time . . . at low cost.

IS GLASS *PIPING* AVAILABLE NOW?

Yes. Glass-making materials are fairly plentiful. We do need priority ratings that enable us to get accessories (flanges, gaskets), to assign necessary labor, and to establish your order in our production line. With such priorities we have been making 6 to 8-week deliveries.

Available sizes and lengths: 1″, 1½″, 2″, 3″, and 4″ diameters; any length from 6 inches to 10 feet (longer lengths on special request). There are corresponding ells, tees, return bends, and reducers.

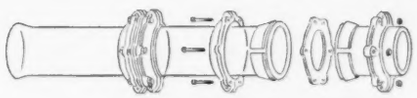
Accessories: Compression type joints—with conical pipe ends compressed to a self-centering gasket by metal flanges and clamping bolts. We supply gaskets of materials suited to the liquid or gas you want to convey



WHERE DOES IT GIVE BEST SERVICE?

Wherever hot or corrosive liquids or gases are conveyed . . . wherever products must be protected from contamination . . . wherever it is important to know what is happening *inside* a line...there PYREX Piping gives you its most profitable service.

Chemical plants use it to eliminate corrosion problems, because it resists all hot or cold acids (except HF). Food and beverage manufacturers like it because it's easy to keep clean, either by simple flushing or with steam or strong hot cleaning solutions. It helps to produce a purer product.



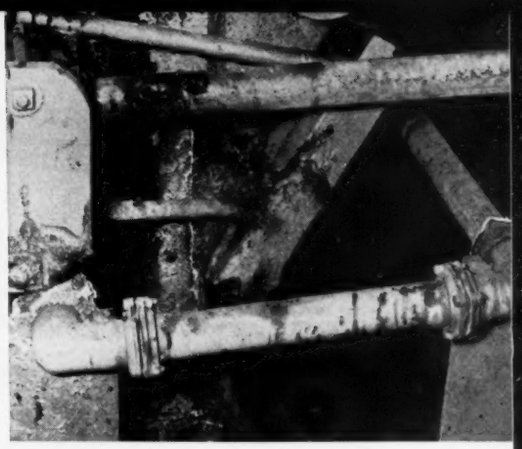
IS IT EASY TO INSTALL?

Plant workmen find it easy to make installations themselves. Recently, green plant mechanics have done first-rate installations with PYREX Piping.

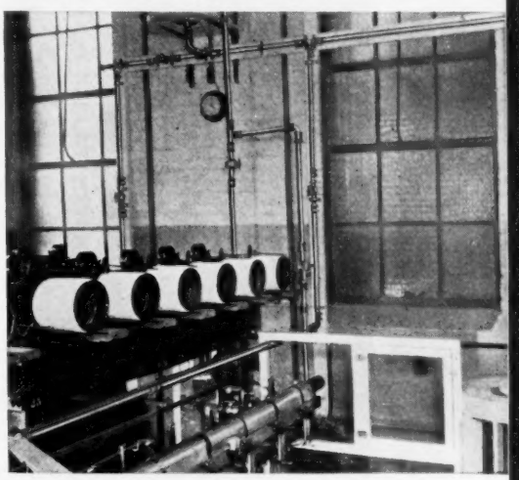
You may install from one piece to a whole system—for PYREX Piping may be joined to existing metal lines and equipment. And it is hung and supported much like other types of piping. We do recommend that hangers and supports be padded, to minimize scratching.

WILL IT STAND UP MECHANICALLY?

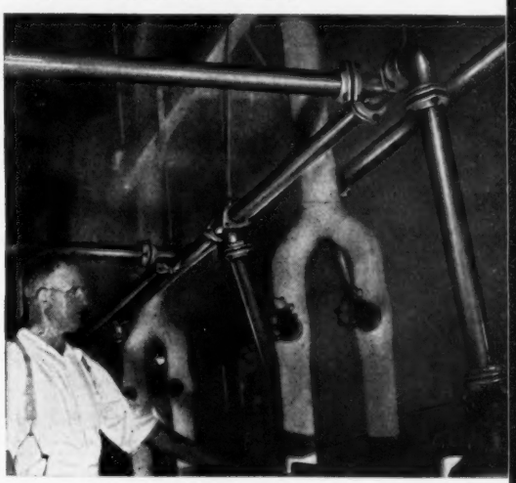
Yes. PYREX Piping is recommended for working pressures up to 100 p.s.i. But glass in this form is not as strong as metal. So, care must be taken to avoid installation strains or sharp impact. Nearly 20 years of service under all kinds of plant conditions have proved that only simple common sense and reasonable care are required to handle PYREX Piping without trouble. The glass itself is very hard—about twice as resistant to abrasion as ordinary plate glass. Thus, the piping is particularly suitable for abrasive, corrosive slurries. You can install and use PYREX Piping with confidence.



Low long-term cost! This PYREX Piping has carried a corrosive, abrasive slurry of crushed quartz and sulphuric acid for over 8 years . . . without one cent of maintenance.



Low initial cost! In this textile plant, PYREX Piping carries delicate but corrosive sizing solution. Plant engineer reports initial cost of about ⅓ that of previous system and commends PYREX Piping for ease of installation, flexibility, absence of leaks, and visibility.



Product protection! This operator in a well-known food plant sees his tomato products *inside* PYREX Piping; and after flushing, he *sees* how clean his lines are. In this plant, corrosive action of fruit and vegetable acids ruined a metal line in one season, but have no effect on present PYREX Piping.

WRITE FOR PIPING BULLETIN!

Watch this magazine for further information on "What Every Plant Operator Should Know about Glass Piping." And write for PYREX Piping Bulletin No. 814. Industrial Division, Corning Glass Works, Corning, N. Y. Branch Offices: New York, 718 Fifth Ave.; Chicago, Merchandise Mart.

"PYREX" is a registered trade-mark and indicates manufacture by Corning Glass Works, Corning, N. Y.

CORNING
Glass Works
Corning, New York

Pyrex Industrial Glass
BRAND

TAM Zircon crucibles are finding wide application for various high temperature applications up to 3500° in non-ferrous melting such as aluminum, platinum, etc. These Zircon crucibles not only resist various acid and alloy reactions, but due to the straight line expansion coefficient of Zircon, exhibit exceptionally good heat shock properties. Refractory bonds consisting of other compounds are not necessary in the manufacture of TAM Zircon crucibles thereby assuring the user of a pure Zircon product.

TAM small crucibles and shapes of semi-vitreous Zirconium oxide are manufactured for use in quartz fusions and high temperature applications up to 4500° F.

An experienced staff of field engineers, located in various parts of the country, are available for consultations without obligation. Write.

TAM PRODUCTS INCLUDE

Zircon bricks, special shapes and crucibles... Zircon insulating refractories... Zircon ramming mixes, cements and grog... Zircon milled and granular... Electrically Fused Zirconium Oxide Refractories... Electrically Fused Zirconium Oxide cements and ramming mixes... Electrically Fused Zirconium Oxide in various mesh sizes.

T A M
ZIRCONIUM TITANIUM PRODUCTS
Registered U. S. Pat. Off.

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ACETONYLACETONE
METHYL "CARBITOL"
TETRAETHANOLAMMONIUM HYDROXIDE

can be supplied Now in Limited Quantities

ACETONYLACETONE

$CH_3COCH_2CH_2COCH_3$

. . . a diketone boiling at 191.4°C., is a water-soluble liquid with a pleasant odor and a slow rate of evaporation. Even in small percentages it reduces the viscosity of nitrocellulose or "Vinylite" resin solutions. Acetonylacetone is a promising intermediate for inhibitors, rubber accelerators, dyes, pharmaceuticals, and insecticides, and readily forms furane, thiophene, and pyrrole type ring compounds.

TETRAETHANOLAMMONIUM HYDROXIDE

$(HOCH_2CH_2)_4NOH$

. . . supplied as a 40 per cent solution . . . is a quaternary base which approaches the fixed bases in alkalinity. Because it decomposes on heating to form weakly basic ethanolamines, it is valuable where it is desirable to destroy a strong base that has been useful at lower temperatures. It is an excellent solvent for certain types of dyes, but is not a solvent for cellulose.

METHYL "CARBITOL"

$CH_3OCH_2CH_2OCH_2CH_2OH$

. . . the methyl ether of diethylene glycol, is completely miscible with water and many organic solvents. It is used as a fixative and diluent for certain perfume materials to replace more "critical" solvents. It shows promise as a component of non-aqueous wood stains and of textile dye pastes, as well as a high-boiling solvent (194.2°C.) in lacquers. The primary alcohol group reacts to form esters, ethers, amines and other interesting derivatives. Its phthalate shows promise as a plasticizer, especially for applications requiring oil-resistance.

Carbide and Carbon Chemicals Corporation produces more than 160 synthetic organic chemicals, and the supply situation among these products is constantly changing. Right now a number of them, including those described here, can be supplied in limited quantities. Some are available now because they are co-products in the making of other chemicals being used for high priority applications. Others are on hand because customers' plants have shifted to war production or cannot get other raw materials to go with them.

At the time this magazine went to press Acetonylacetone, Methyl "Carbitol," and Tetraethanolammonium Hydroxide . . . and a number of others . . . could be supplied in less-than-carload quantities. If you are interested in obtaining quantities of any of these interesting chemicals, write for further information.

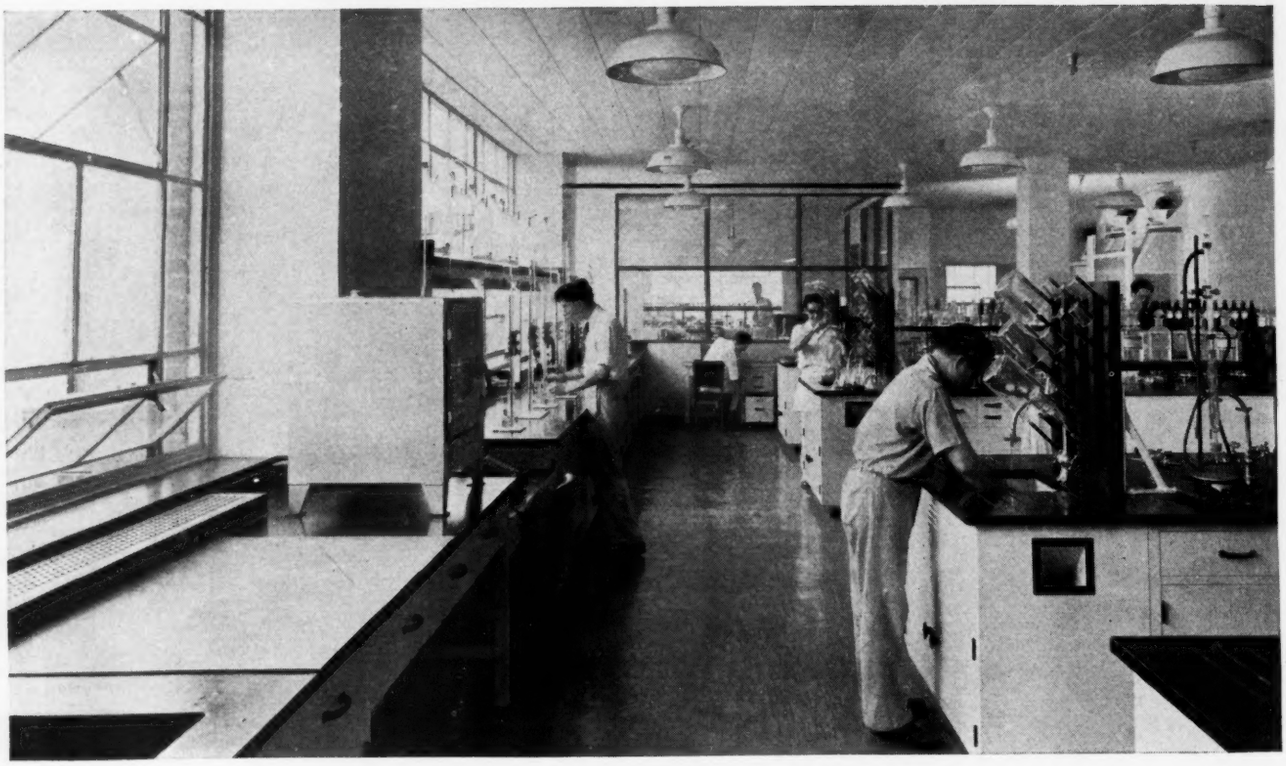
For information concerning the use of these chemicals, address:

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York, N. Y.

PRODUCERS OF SYNTHETIC ORGANIC CHEMICALS



Analysis

• Chas. Pfizer & Co., Inc. has always regarded the careful and intelligent examination of all products as not only a necessary but also an important part of its manufacturing processes. We believe that the uniformity and high purity of our products cannot be assured without thorough examination and that it involves more than just the routine checking of materials against certain specifications.

The personnel of our Analytical Department is of the highest caliber and every effort has been made to make the most modern equipment available. Through thorough and careful analysis it has been possible for this department to make many suggestions which have resulted in improved products and improved methods of manufacture.

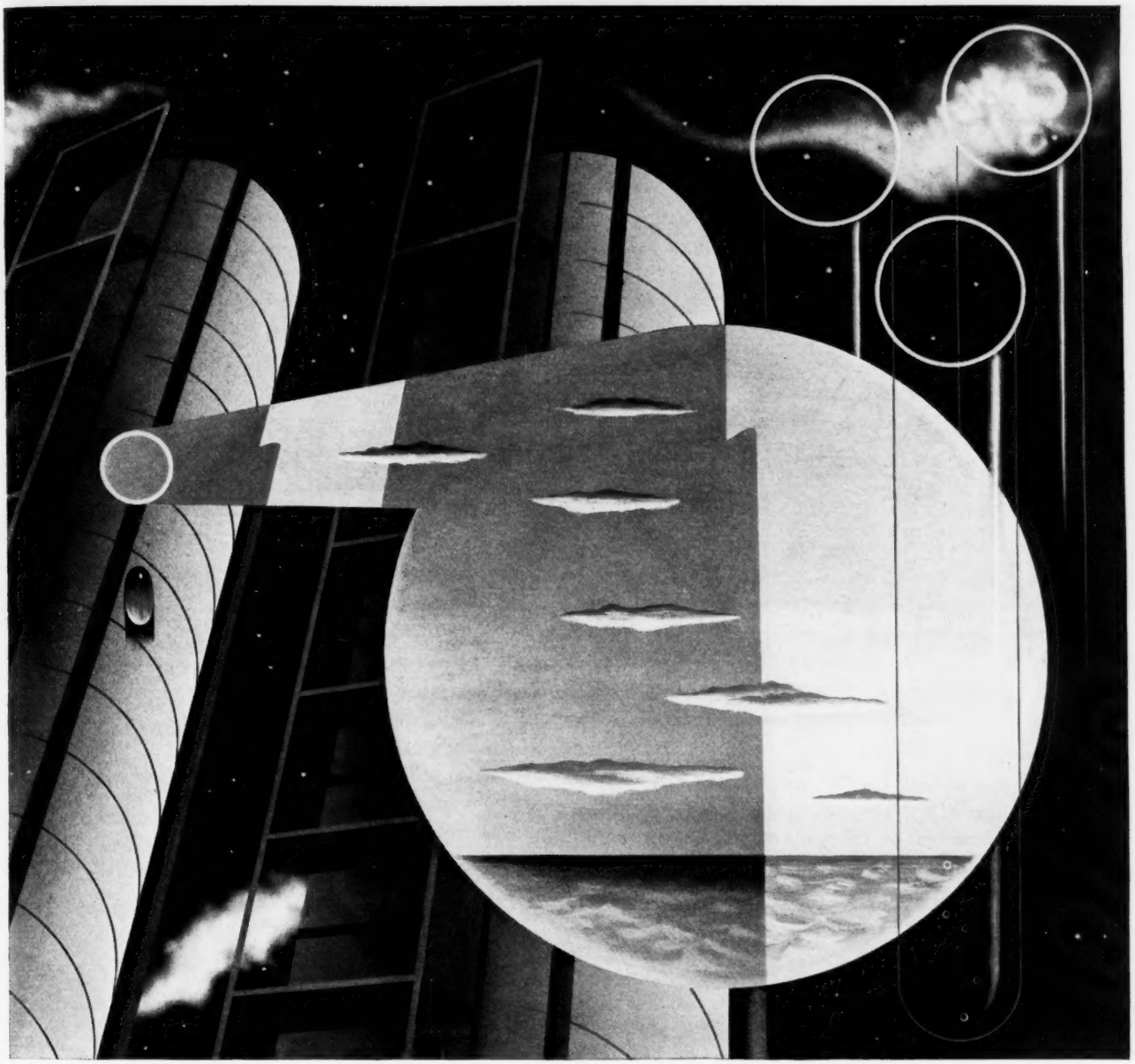
The research division of this department is constantly striving to improve or devise new techniques for the examination and analysis of our materials. New products, too, have always occasioned considerable analytical research, it often having been necessary to revise existing analytical methods to a great extent, or even to devise entirely new procedures. Needless to say, all of this would be impossible if analysis were considered to be merely a routine matter.

We feel that the reputation for dependability and high quality which our products enjoy is due in no small measure to our Analytical Department.

MANUFACTURING CHEMISTS • ESTABLISHED 1849

Chas. Pfizer & Co., Inc.

81 MAIDEN LANE, NEW YORK • 444 W. GRAND AVE., CHICAGO, ILL.



It's already Day after Tomorrow!

Under the stinging lash of a war for survival, American chemists are fighting fantastic battles . . . cramming a year's progress into a day . . . drawing up, in advance, the pattern of things to be.

For this is the new, stupendous era of synthetics. Already scientists are talking about glass that will float, wood that won't burn, window screens without wire, machinery bearings without metal.

Badger—with its engineers, chemists, draftsmen, designers, construction workers—is helping in this effort to save America now, to enrich her later on.

Among its many war jobs, Badger is building plants and equipment for the manufacture of butadiene and other materials required to make artificial rubber. It is building plants for producing acetic acid and phthalic anhydride used in the manufacture of plastics for airplanes. It is building plants for the manufacture of T.N.T. It is erecting huge refineries for the production of high-octane aviation gasoline.

Miracles are being performed in the petro-chemical industries today. For obvious reasons, they can't be talked about in detail. But they do send this message to every American: Win this war—and the dawn will break on a world more wonderful than you have ever known.

E. B. Badger & SONS CO., BOSTON · EST. 1841

NEW YORK · PHILADELPHIA · SAN FRANCISCO · LONDON

PROCESS ENGINEERS AND CONSTRUCTORS FOR THE PETRO-CHEMICAL INDUSTRIES

MOST of American Industry knows which brand of Neutral & Common Degras is *"America's 1st choice"*—the MALMSTROM NIMCO BRAND!

It's *first* because in the production of Nimco Brand Degras, Malmstrom research has eliminated most of the crossed finger —"good enough" methods of manufacture.

That's why today, you can order Malmstrom's Nimco Brand to *your required specification* and know that your next shipment will *check* with the previous one. This is just 1 of 9 important reasons why Malmstrom's Nimco Brand is *today's favorite* . . . reasons that are important to every producer who wants better quality without paying a premium for quality Degras.

Testing samples are available free, but our advice is that you order a quantity to check results on a commercial basis.

America's No. 1 Choice Because It's 9 WAYS BETTER

MALMSTROM NIMCO BRAND DEGRAS NEUTRAL & COMMON

1. LOW MOISTURE
2. LOW ASH CONTENT
3. MINIMUM ODOR
4. CONTROLLED COLOR
5. UNIFORM QUALITY
6. UNIFORM TEXTURE
7. CONTROLLED VISCOSITY
8. CONTROLLED MELTING POINT
9. AVAILABLE TO *ANY* SPECIFICATION

BEST FOR RUST PREVENTATIVES • PROTECTIVE COATINGS TANNING COMPOUNDS • LUBRICATING OILS & GREASES CORDAGE OILS • METAL DRAWING COMPOUNDS • BELT DRESSINGS • PAINTS & VARNISHES • PRINTING INKS • SOAPS

N. I. MALMSTROM & CO.

America's Largest Suppliers of

DEGRAS • Neutral and Common • **WOOL GREASES**

LANOLIN • Anhydrous U.S.P. • Hydrous U.S.P. • Absorption Base • Technical

147 LOMBARDY STREET • BROOKLYN, NEW YORK

STOCKS CARRIED IN CLEVELAND • CHICAGO • KANSAS CITY • MINNEAPOLIS • LOS ANGELES

An activated aid to processing **DARCO** REG. U.S. PAT. OFF. *An active aid for purity specifications*

..But

How Would You Fish for Molecules?

If you have a process liquid with unwanted color, odor, or colloid molecules in it, you can't get them out with fish-hooks, or strain them out with a net.

But the chances are excellent that you can remove them with DARCO!

For DARCO activated carbon has enormous *adsorptive* surface to which such impurities adhere. When the DARCO is filtered out, out come the "molecular fish" with it.

Please note this, too: DARCO adds nothing to the chemical composition of your liquid. DARCO'S reaction is not chemical, nor does DARCO remain in the liquid. Its sole action is adsorptive.

DARCO representatives have had years of experience in solving purification problems for a wide range of products. In your plant, they can give valuable suggestions on such matters as efficiency in mixing . . . contact time . . . counter current treatment . . . filtration. New methods of application are increasing both the scope and efficiency of DARCO purification.

Ask your technical staff to get in touch with the DARCO representative.

DARCO Reg. U. S. Pat. Off.

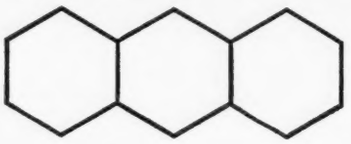
DARCO

DARCO CORPORATION

60 East 42nd Street, New York, N. Y.

Reilly
COAL TAR PRODUCTS

ANTHRACENE



PURITY: Ninety per cent minimum.

BOILING POINT: Approximately 341.0°C., at 760 mm.

FREEZING POINT: 210°C. minimum.

SOLUBILITY: Insoluble in water. Soluble in hot alcohols, ketones, esters, ethers, aromatic hydrocarbons, and chlorinated aromatic hydrocarbons.

USES: An intermediate in the preparation of dyes, in the manufacture of anthraquinone, the stabilization of gasoline, as an insecticide, a fungicide, in pyrotechnics, tanning agents, printing inks.

SHIPPING CONTAINERS: 145-lb. (approximate) barrels.

OTHER GRADES OF ANTHRACENE: 80% grade by analysis.

A Dependable Source of Supply for All Coal Tar Products

With unusual production and delivery facilities, plants in 17 strategic locations, and offices in major cities, Reilly offers a complete line of coal tar bases, acids, oils, chemicals and intermediates. Booklet describing all of these products will be mailed on request.

REILLY TAR & CHEMICAL CORPORATION

Executive Offices: Merchants Bank Building, Indianapolis, Indiana

2513 S. DAMEN AVENUE, CHICAGO, ILLINOIS 500 FIFTH AVENUE, NEW YORK, N. Y. ST. LOUIS PARK, MINNEAPOLIS, MINN.

SEVENTEEN · PLANTS · TO · SERVE · YOU

IT PAYS TO TALK TO THE

Bemis Multiwall Paper Bag Expert

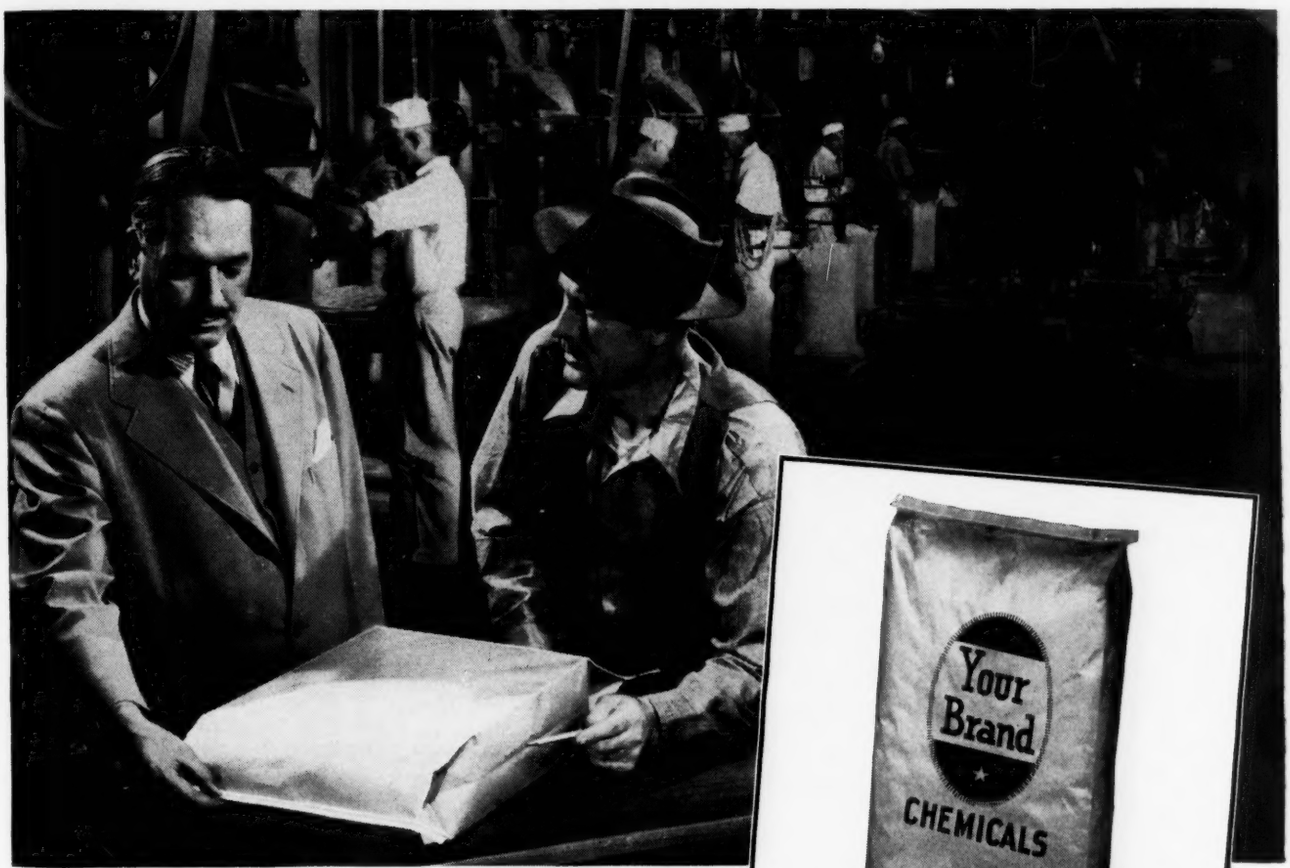
"You're more than just a bag expert. You're a detective!"

That's what a bag user said after one of our Multiwall Paper Bag experts visited his plant and solved a troublesome packaging problem which had been stealing his profits.

The counsel of our staff covers every phase of packaging by the bag . . . the bags themselves, filling and closing, shipping and storage. Our experts can give competent advice on these subjects because they *know* every angle of packing and shipping. Often they show manufacturers how to increase production and cut costs in the packing room.

Services of our experts are available to you without cost or obligation . . . whether you're a Bemis customer or not.

Next time you have a packaging problem, write or wire our nearest office. We'll have an expert on the job promptly . . . and it won't cost you a penny!



Bemis representatives are the kind of men who take off their coats and tackle a problem from a practical, experienced point of view.

CHEMICAL INDUSTRY CUTS COSTS AND REDUCES LOSSES WITH BEMIS MULTIWALL PAPER BAGS

Bemis Multiwall Paper Bags for chemicals are economical, one-trip containers that insulate against moisture, and thus reduce caking and loss of quality. Their extra strength maintains output by minimizing breakage on production lines. Bemis self-forming gussets speed filling and closing. Brilliant Bemis printing makes brands stand out.

BEMIS BRO. BAG CO.

East Pepperell, Mass. • Peoria, Ill. • San Francisco, Calif.
Wilmington, Calif. • St. Helens, Oregon

Baltimore • Boston • Brooklyn
Buffalo • Charlotte • Chicago
Denver • Detroit • Houston
Indianapolis • Kansas City
Los Angeles • Louisville • Memphis • Minneapolis • New Orleans • New York City • Norfolk • Oklahoma City • Omaha • St. Louis
Salina • Salt Lake City • Seattle • Wichita

Return Engagement.. with the Same Duraglas All-Star Cast!

TRADE MARK REG. U. S. PAT. OFF.

It's Your Duty to Save what you have
...and Smart to Buy Conservation Aids in Duraglas* CONTAINERS
CLAUDETTE COLBERT
Keep home, clothing, car and household equipment in good condition. Use cleansers, polishes, waxes and many other products that add to the life and appearance of your possessions.
Look for the name Duraglas* on all containers. It indicates that the maker insists on the best of everything, including his package.
OWENS-ILLINOIS GLASS
OWENS-ILLINOIS GLASS COMPANY, TOLEDO — DEVELOPERS OF *Duraglas — THE IMPROVED TECHNIQUE IN GLASSMAKING

★ *First* SEEN IN
THE SATURDAY EVENING POST
NOVEMBER 21, 1942
(Circulation 3½ Million!)

★ *Now* Running in
FEBRUARY
WOMAN'S HOME COMPANION
(With an Audience of 4 Million More!)

Household Conservation news gets a big hand from American women who read Duraglas advertisements like the one shown here.

And they know from experience that homemaking, hygiene and beauty products in Duraglas containers mean dependable, convenient packaging. They see what they buy. They know how much is used, and when to buy again.

You can be certain that Mrs. America wants to buy *your* product in Duraglas today—and tomorrow. For once she has experienced its convenience and savings, you are doubly sure she will insist on the best from then on. Owens-Illinois Glass Company, Toledo, Ohio.

OWENS-ILLINOIS
GLASS COMPANY TOLEDO, OHIO

EXCLUSIVE DEVELOPERS OF Duraglas CONTAINERS

Caustic Soda

PROMPT SHIPMENTS

QUICK HANDLING

Penn Salt Liquid Caustic Soda is shipped in tank cars specially designed for speedier, safer unloading. These modern 8000-gallon tank cars have a protective lining, are insulated and are equipped with caustic resistant valves and interior fittings. They can be quickly and completely emptied—no wasted caustic, no lost time.

Penn Salt Caustic Soda is supplied as 50% and 72-73% solutions in tank car quantities; as a solid in 750 lb. drums; or in flake form in 400 lb. and 125 lb. drums.

Our technical staff is at your service for help with handling problems. Write for complete information. Pennsylvania Salt Manufacturing Company, 1000 Widener Building, Philadelphia, Pa. Branch Offices: New York • Chicago • St. Louis • Pittsburgh • Wyandotte • Tacoma.

PENN SALT *Chemicals*

OIL SAVERS—PQ SILICATES

With greases and oils on the critical list, those processing methods get priority that prevent the waste of even a drop or gob. Many of these conservation methods effectively and economically use PQ Silicates of Soda. Do you know how PQ Silicates can serve you as oil savers? Check the uses below about which you want more details and mail those paragraphs with your letterhead to us in Philadelphia.

☐ *Reclaiming Used Crank Case Oil:* B-W or O Brand agitated with the oil and water wets carbonaceous and other solid impurities, so that they settle into the watery layer, leaving clear oil.

☐ *Greaseproofing Concrete:* Oil storage tanks are protected against oil penetration and oil loss as well, by a treatment with PQ Silicate of Soda. Recommended for either mineral or vegetable oils.

☐ *Lining Wood Barrels:* Coating wooden packages to prevent absorption of vegetable and animal oils is established practice. Silicate is the cooper's most economical lining material.

☐ *Greaseproofing Paper:* Paper and paperboard coated with the correct brand of silicate are used for packaging greasy and oily products. The vermin-proof qualities of silicate are important for food products.

PHILADELPHIA QUARTZ CO.

Established 1831 . . . General Offices and Laboratory: 125 S. Third Street, Philadelphia, Pa.
Chicago Sales Office: Engineering Bldg. Sold in Canada by National Silicates Ltd., Toronto, Ont.

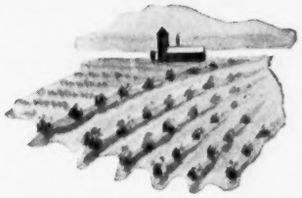
The familiar bomber nose is a *PLEXIGLAS* nose

PLEXIGLAS, the crystal-clear acrylic plastic which made possible the familiar bomber nose, as well as other transparent parts aboard every type of Army and Navy plane, was developed in Rohm & Haas laboratories, first brought to commercial production in Rohm & Haas plants.

There the first transparent plastic bomber nose was built, and the method for mass production of these curved sections was developed. Formed from "aviation's standard transparent plastic," the now famous PLEXIGLAS "greenhouse" is one of numerous examples of a chemical development begun in peace which is now meeting the needs of war.

***TEGO*...AND PLYWOOD PLANES**

Five years before the war began the manufacture of plywood was literally revolutionized when our associate, The Resinous Products & Chemical Co., introduced a new resin adhesive in sheet form—TEGO. Bonded with this resin, veneers became a "wonder-wood," weight for weight stronger than steel, weatherproof, fungus-proof. Today practically all aircraft plywood is TEGO bonded plywood.



***LETHANE*... AND INSECTS**

As a result of prewar research, LETHANE, the first synthetic organic insecticide was developed in Rohm & Haas laboratories. LETHANE is the killing agent in leading agricultural, household, livestock and industrial insect sprays. When war sharply curtailed imports of rotenone and pyrethrum, LETHANE, made from American materials, stood ready to relieve this shortage of botanical toxicants.

ONE ORGANIZATION'S PART

The chemical companies most active in research before Pearl Harbor are today the ones most helpful in prosecuting the war. The Rohm & Haas Company and its associates are giving effective aid to the war effort as a result of their peacetime research.

PLEXIGLAS, TEGO *and* LETHANE
are trade-marks Reg. U. S. Pat. Off.

ROHM & HAAS COMPANY

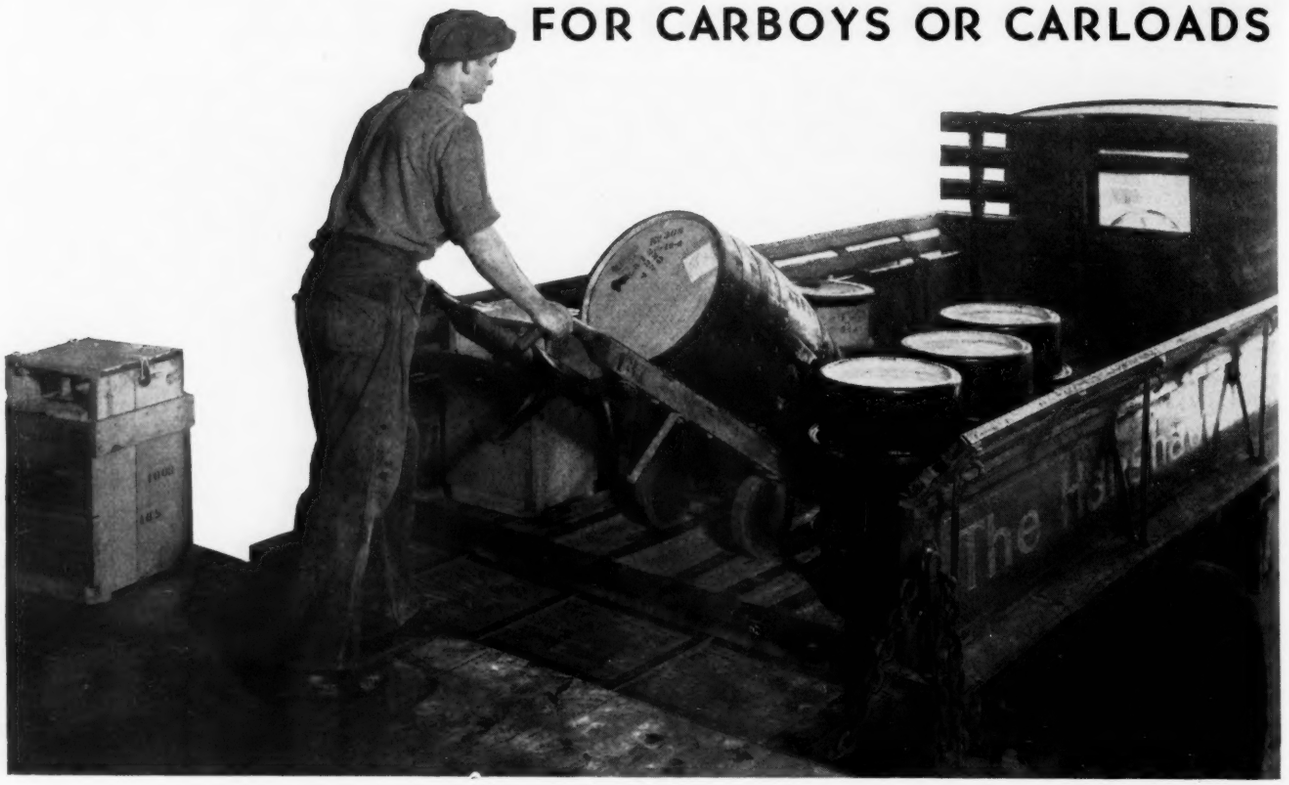
AND ASSOCIATES:

THE RESINOUS PRODUCTS & CHEMICAL COMPANY • CHARLES LENNIG & COMPANY

WASHINGTON SQUARE, PHILADELPHIA, PA.

Manufacturers of Plastics, Insecticides and Fungicides, Coating Resins, Plywood Adhesives, Ion Exchange Resins and Chemicals for the Leather, Textile, Enamelware and Other Industries.

FOR CARBOYS OR CARLOADS



—WHEN THE ORDER IS **RUSH**

CALL ON HARSHAW **FIRST**

HARSHAW

If you have a chemical problem, discuss it with a Harshaw man. There's one near you. He is technically trained, and has considerable chemical knowledge at his finger tips. Ask him to help.

Maybe we can save a precious hour or day in delivering the chemicals you need for your manufacturing processes. We'll try — hard — to meet your tightest schedules.

But whenever you can anticipate your chemical requirements, it will help us to give you the service you want by ordering as far as possible in advance. The hundreds of chemicals we manufacture cover the regular requirements of industry and most of the special ones. Whether it's for a pound or a carload, your order will be given streamlined attention.

The men at Harshaw who handle your order are part of an organization that has more than 50 years of chemical experience behind it. Today, in both plant and office, this organization is geared to help you meet your war production schedules.

THE HARSHAW CHEMICAL COMPANY

1945 E. 97th Street, Cleveland, Ohio - - - - Branches in Principal Cities

RS-2 X-1 RESINOUS OIL RS-8 DIBUTYL PHTHALATE RS-9
NEVOLL
RS-5 RS-11
RS-3 RS-12
R-17 RESIN R-29 RESIN

NEVILLE

COAL TAR SOFTENERS

for Synthetic Rubber

Does the compounding of synthetic rubbers confuse you? Are you still unable to get that specific property you must have?

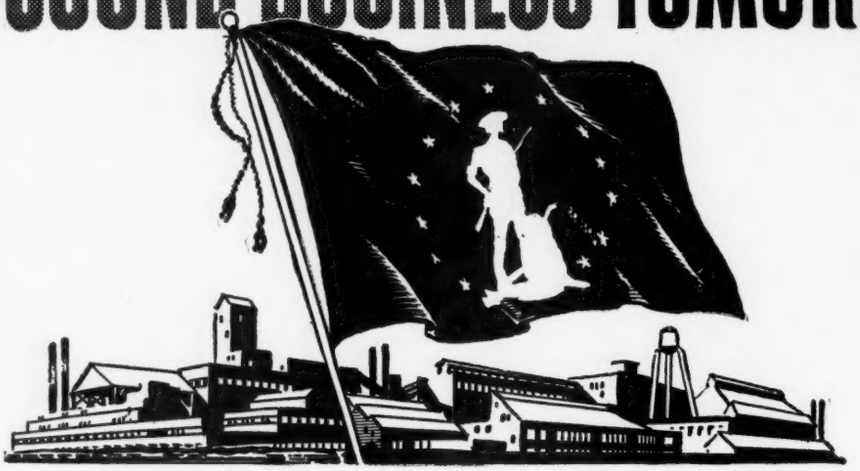
One of Neville's many synthetic rubber softeners might give you the very result you are seeking. Write for our new leaflet on the behavior of Neville Softeners with Government Synthetic Rubber GR-S (Buna S) and for further information on Neville Softeners for other synthetic and natural rubbers.

R-6

THE NEVILLE COMPANY
PITTSBURGH · PA.
Chemicals for the Nation's War Program

BENZOL • TOLUOL • XYLOL • TOLUOL SUBSTITUTES • CRUDE COAL-TAR SOLVENTS
HI-FLASH SOLVENTS • COUMARONE-INDENE RESINS • TERPENE RESINS • TAR PAINTS
RUBBER COMPOUNDING MATERIALS • WIRE ENAMEL THINNERS • DIBUTYL PHTHALATE
RECLAIMING, PLASTICIZING, NEUTRAL, CREOSOTE, AND SHINGLE STAIN OILS

FOR VICTORY TODAY AND SOUND BUSINESS TOMORROW



Get This Flag Flying Now!

This War Savings Flag which flies today over companies, large and small, all across the land means *business.* It means, first, that 10% of the company's gross pay roll is being invested in War Bonds by the workers voluntarily.

It also means that the employees of all these companies are doing their part for Victory . . . by helping to buy the guns, tanks, and planes that America and her allies *must* have to win.

It means that billions of dollars are being diverted from "bidding" for the constantly shrinking stock of goods available, thus putting a brake on inflation. And it means that billions of dollars will be held in readiness for post-war readjustment.

Think what 10% of the national income, saved in War Bonds now, month after month, can buy when the war ends!

For Victory today . . . and prosperity *tomorrow,* keep the War Bond Pay-roll Savings Plan rolling in *your* firm. Get that flag flying now! Your State War Savings Staff Administrator will gladly explain how you may do so.

If your firm has not already installed the Payroll Savings Plan, *now is the time to do so.* For full details, plus samples of result-getting literature and promotional helps, write or wire: War Savings Staff, Section F, Treasury Department, 709 Twelfth Street NW., Washington, D. C.

EVERYBODY EVERY PAYDAY AT LEAST 10%

Save With

War Savings Bonds

This Space Is a Contribution to America's All-Out War Program by

CHEMICAL INDUSTRIES

Rapidly erasing American dependence on foreign rubber sources

Naturally enough—rubber, to most people, means tires. Yet there are thousands of other uses for rubber—all just as vital, and *all eating into the slim supply of natural rubber that could otherwise be utilized for tires.*

And that's where Agripol fits in—because this astonishing new product of farm and science can do, and *is* doing, an even better job than natural rubber in many vital industrial applications! What's more, this *chemurgic* synthetic rubber is made from materials grown in huge quantities right here at home . . . it is already being produced in volume . . . and, for further time-saving, it can be fabricated with present equipment of rubber goods manufacturers!

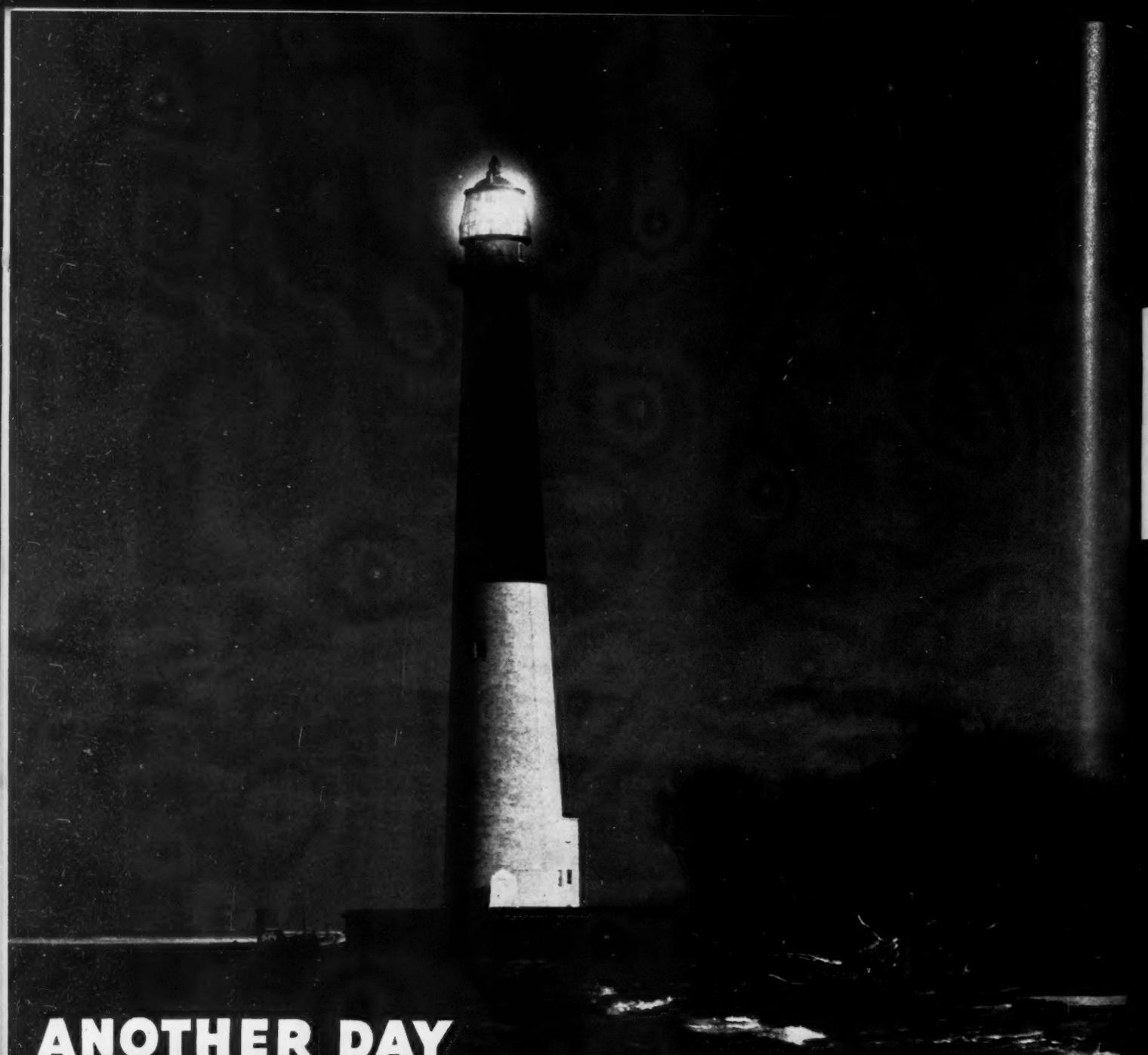
RCI, in collaboration with the Peoria, Illinois, Research Laboratories of the United States Department of Agriculture, offers Agripol to America as an immediate and practical step toward American independence from foreign rubber sources. That is its *present* purpose. For the *future*—it offers one important answer to the longtime hope that industry and agriculture might sometime join hands for the greater prosperity of both.

REICHHOLD CHEMICALS, INCORPORATED

General Offices & Main Plant, Detroit, Michigan. Other Plants: Brooklyn, N. Y.; Elizabeth, N. J.; South San Francisco, Calif.; Tuscaloosa, Ala.; Liverpool, England; Sydney, Australia.

CHEMURGIC RUBBER • INDUSTRIAL PLASTICS • INDUSTRIAL CHEMICALS CHEMICAL COLORS • SYNTHETIC RESINS

RCI



ANOTHER DAY WILL DAWN...

RIGHT now Heekin high speed presses for lithographing color on metal are busy day and night producing packages for use in defense—if you have such a package, we can give you quick, efficient service. But today is the time to plan for tomorrow . . . for another day will dawn . . . and you will want new ideas . . . an improved package with finer colors. We want you to know that Heekin offers you all of our facilities to do this job. In the meantime—Look Ahead.
THE HEEKIN CAN CO., CINCINNATI, OHIO.

HEEKIN CANS

Lithographed

WITH HARMONIZED COLORS

THE PRACTICAL MATERIAL FOR HANDLING ACIDS AND CHEMICALS

IMMUNE FROM CORROSION . . . NON-ABSORBENT . . .

ILLINOIS *Chemical* PORCELAIN

SAVES CRITICAL MATERIALS

This organization is ready to co-operate with you in the production of chemical porcelain in shapes and sizes for wide application.

ILLINOIS Chemical Porcelain has many natural advantages for use where corrosive liquids are processed — it is durable, therefore saves on maintenance and replacements — it adds greater safety to your installation, being immune from corrosion — it is free from contamination, being non-absorbent — it conserves vital materials — it is a factor in maintaining the highest operating efficiency.

Our experience in the production of porcelain products is extensive. You are not obligated by inquiry.

Chemical Division

ILLINOIS ELECTRIC PORCELAIN COMPANY

MACOMB, ILLINOIS

IMPREGNABLE.

TO ATTACK BY DESTRUCTIVE ELEMENTS

WAR materials, shipped in steel drums, arrive safely—fresh and pure as the day they were packed. Foods of all kinds, including dehydrated foods, frozen foods, shortening, preserves, syrups, edible oils and hundreds of other products, are best protected by Steri Sealed Lined Steel Containers. Chemicals, munitions, soaps, insecticides, lubricating oils and the life blood of our air fighters—aviation gasoline, are shipped in steel for *absolute protection.* The service performed by steel containers, under the severe conditions of transportation imposed by military operations, is the best endorsement of their value for safe packaging when they are again available for general civilian use.

INLAND STEEL CONTAINER CO.

Formerly WILSON & BENNETT MANUFACTURING COMPANY

6532 S. MENARD AVE. CHICAGO, ILLINOIS

Plants at Chicago—Jersey City— New Orleans—Richmond, Calif.

Sales offices in all principal cities

CONTAINER SPECIALISTS

INLAND STEEL CONTAINER CO. Steri Sealed LINED STEEL CONTAINERS JERSEY CITY · NEW ORLEANS RICHMOND, CALIF. CHICAGO No.

"You mean your kraft paper can do that?"

RECENTLY, one manufacturer after another has expressed amazement in just those words. They had no idea of the jobs that kraft paper packages and multi-wall bags are now performing.

We don't know what your particular "THAT" may be. But if you have a packaging or shipping problem, we'd like to call to your attention the fact that kraft multi-wall bags are successfully replacing containers formerly made of metal, burlap and other scarce materials...meeting specific demands in numerous industries...serving, and serving well, in thousands of important tasks.

WITH MULTI-WALL CONSTRUCTION, Union Bag & Paper Corp. offers highly efficient methods of packaging and shipping agricultural, chemical, fertilizer, food and rock products...affords a decided weight and space-saving advantage.

• • •

IN THE FIELD OF WAR PACKAGING, Union Bag & Paper Corp. is able to make kraft papers resistant to oil, grease and water, super-strong, non-scuff, flavor-sealing, fold-enduring, and eye-appealing...is able to make kraft containers that have one, or ALL of these important advantages.

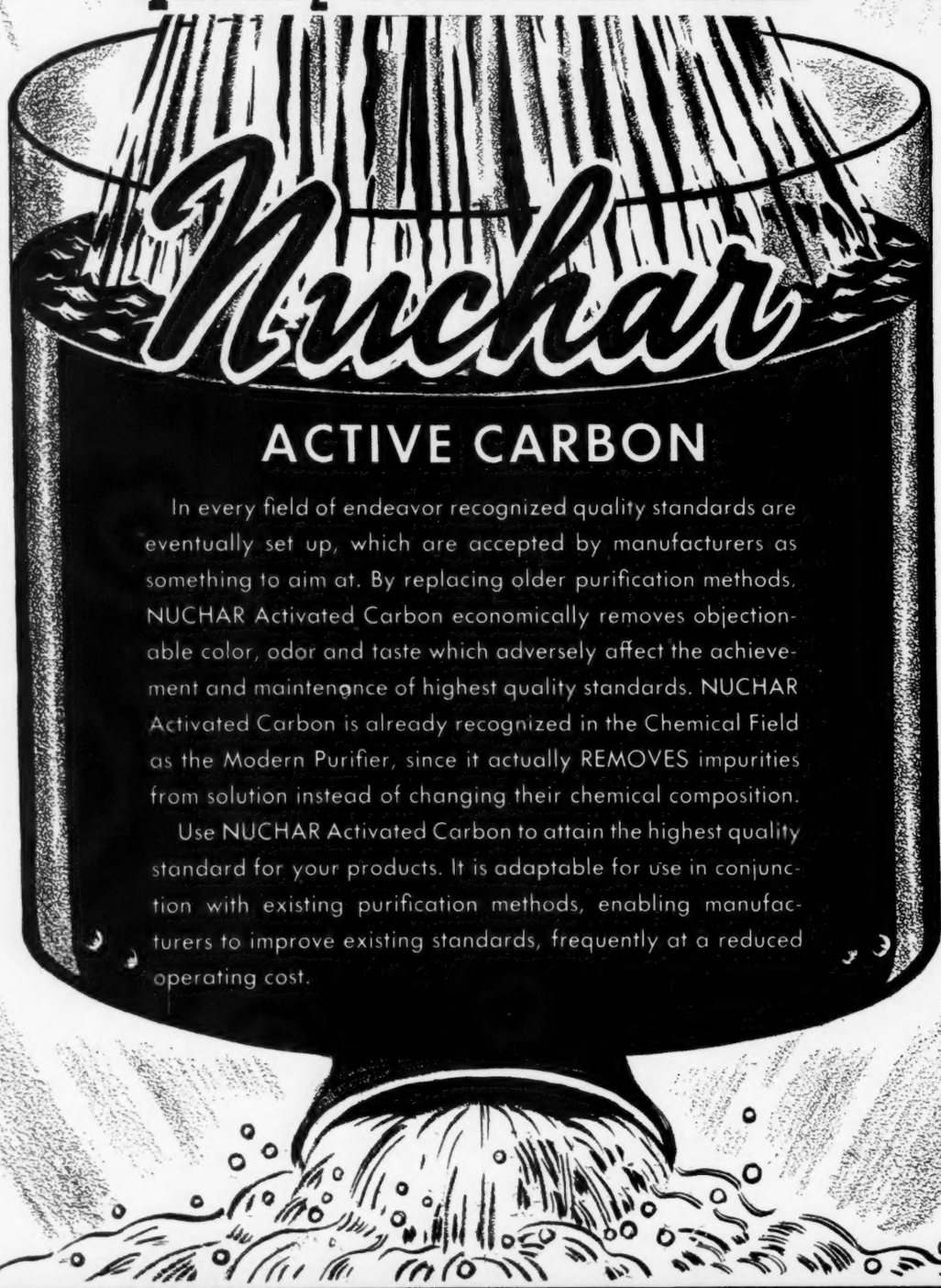
Whatever your wartime container or package problem... no matter how difficult it may seem...consult

UNION BAG & PAPER CORP.

WOOLWORTH BUILDING, NEW YORK, N. Y.

KRAFT PAPER—THE SERVICE UNIFORM OF AMERICAN PRODUCTS

Remove impurities and improve quality standards with



ACTIVE CARBON

In every field of endeavor recognized quality standards are eventually set up, which are accepted by manufacturers as something to aim at. By replacing older purification methods, NUCHAR Activated Carbon economically removes objectionable color, odor and taste which adversely affect the achievement and maintenance of highest quality standards. NUCHAR Activated Carbon is already recognized in the Chemical Field as the Modern Purifier, since it actually REMOVES impurities from solution instead of changing their chemical composition.

Use NUCHAR Activated Carbon to attain the highest quality standard for your products. It is adaptable for use in conjunction with existing purification methods, enabling manufacturers to improve existing standards, frequently at a reduced operating cost.

NUCHAR

INDUSTRIAL CHEMICAL SALES

DIVISION WEST VIRGINIA PULP & PAPER COMPANY

230 PARK AVENUE, NEW YORK CITY
35 E. WACKER DRIVE, CHICAGO, ILLINOIS
748 PUBLIC LEDGER BLDG, PHILADELPHIA, PA.
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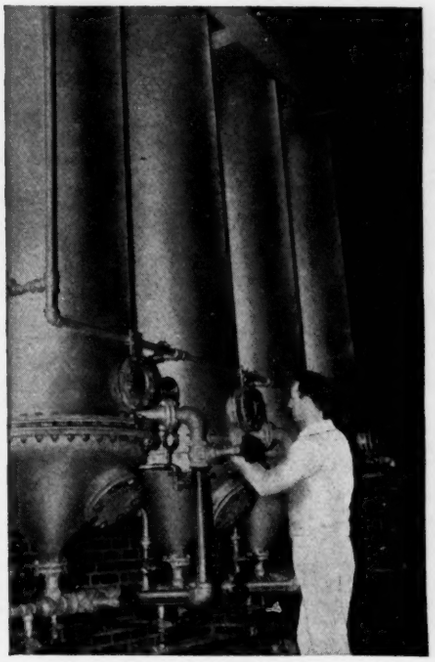
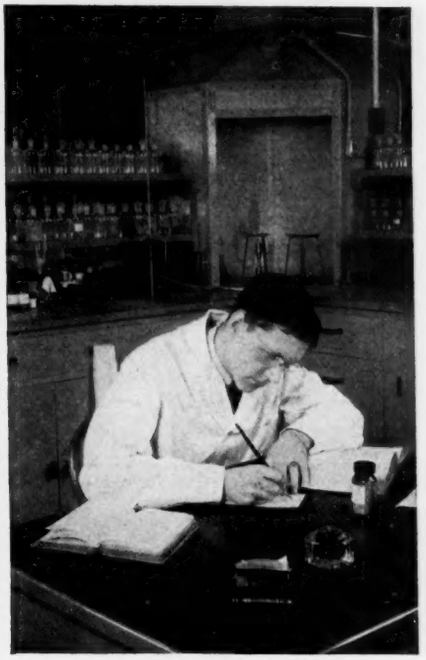
Merck Ephedrine is the result of extensive chemical research.



A step in the production of Merck Ephedrine on a commercial scale.



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Merck EPHEDRINE

- **It is identical with the natural alkaloid.**
- **It is officially recognized by *The United States Pharmacopoeia.***
- **It is independent of foreign sources of supply.**

AN important contribution to the American chemical industry was the evolution of Merck Ephedrine, and its production on a commercial scale. This product, *identical with the natural alkaloid* and officially recognized by *The United States Pharmacopoeia*, established an independence of the foreign source of supply for American consumers. Pharmacologic and clinical tests have proved that its action and therapeutic effects are identical with those of the natural product.

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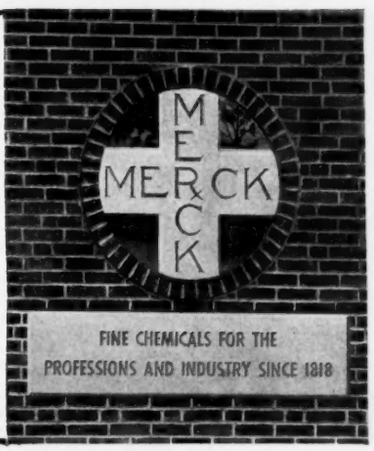
- **Ephedrine Hydrochloride U.S.P.**
- **Ephedrine Sulfate U.S.P. Crystals and Powder**

RACEMIC EPHEDRINE IS AVAILABLE AS:

- **Racemic Ephedrine Alkaloid**
- **Racemic Ephedrine Hydrochloride**
- **Racemic Ephedrine Sulfate**



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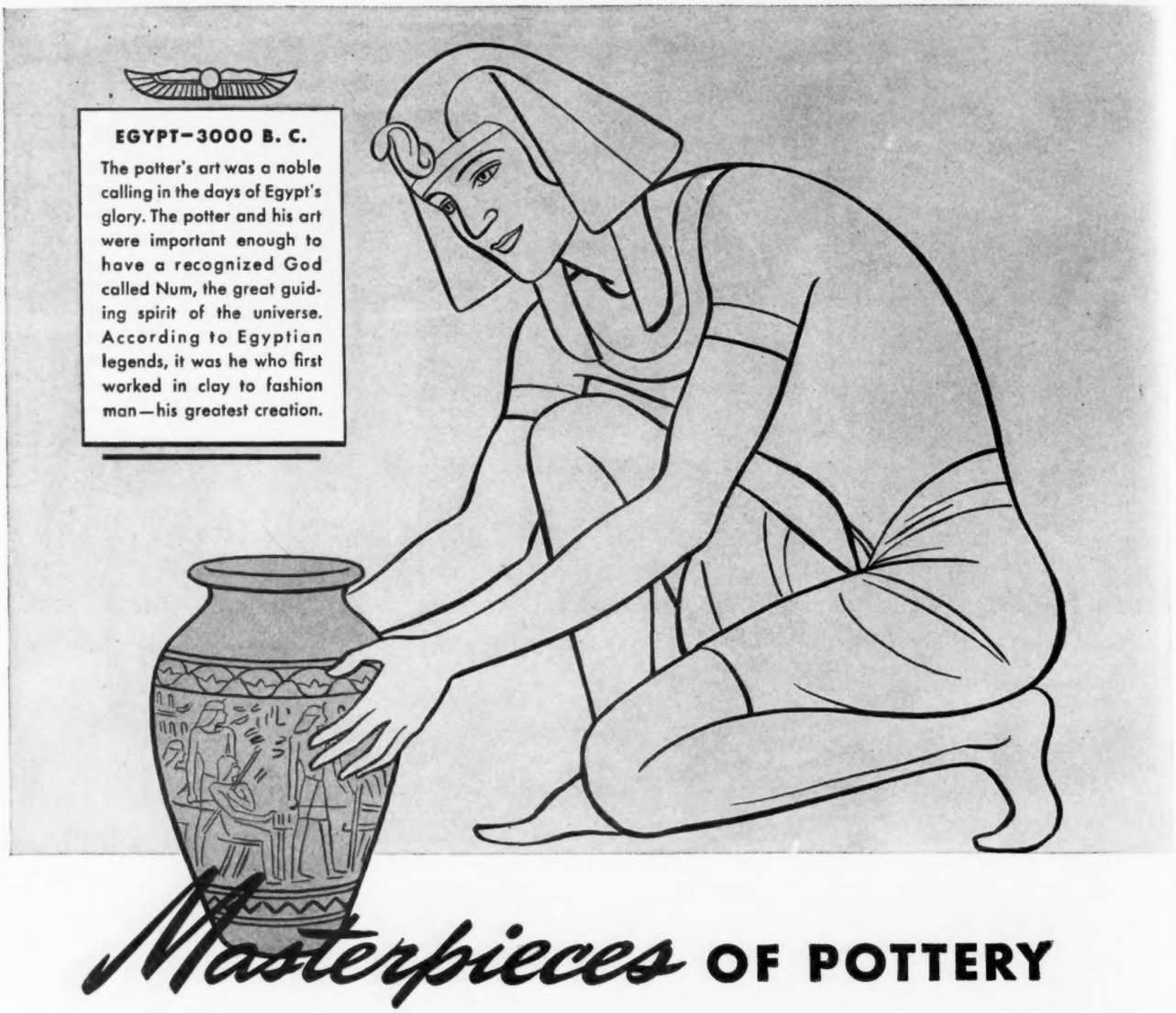

EGYPT—3000 B. C.

The potter's art was a noble calling in the days of Egypt's glory. The potter and his art were important enough to have a recognized God called Num, the great guiding spirit of the universe. According to Egyptian legends, it was he who first worked in clay to fashion man—his greatest creation.

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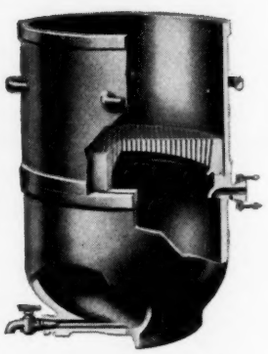

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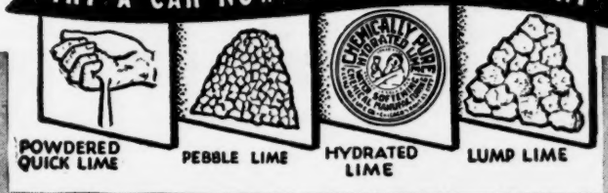

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Post-War Planning

EDITORIAL

Planning for a post-war world is on the country's mind these days. This may seem a bit presumptuous but it shouldn't be so. Some people are annoyed with this idea. They say: Let's get on with the war. Let's worry about the post-war world after we've won. And in a way their stand has certain factors in its favor. We must certainly get on with the war, but can we dissociate the war from the effects it will bring? And will we have time to plan quickly enough at the end of the war?

At the end of World War I peace burst upon the Allies so quickly that they were unprepared for it. Nobody knew what should be done. Although the Allies fought the war together, they were not together at the peace table and it seems made a botch of things, thereby setting the scene for the present conflict we find ourselves in.

We want to avoid as much of that as possible this time, not only on an international scale but also the bad economic and industrial effects on our national life. It's not too soon to start planning now for reconversion from war production to supplying the wants of our citizens.

In getting back to a production for peace basis we are going to run into some pretty difficult problems. For one thing we will have an employment problem of unprecedented proportions. In the first place because we will have a greater proportion of men in the armed forces to reabsorb. In the first World War this amounted to about four per cent while in this war it will be eight to ten per cent. Secondly, because in this war there has been a much greater concentration of workers in war industries. Thirdly, we went into this war with a serious unemployment problem and therefore we will not be able to fall back to a pre-war level but must go ahead by several million jobs. In the fourth place, women have and probably will continue to enter into the industrial employment picture to a great extent.

On top of all this we must realize that during the present time industry is operating at higher levels of production than ever before and doing it in the absence of five or six million of the nation's best manpower.

Factors that influence this post-war employment problem are many. In a recent report the Brookings Institution listed and discussed some of them more or less as follows:

On the favorable side are a retarded rate of demobilization of the armed forces, the great reconstruction requirements in foreign countries, the domestic shortages of consumer goods, the delayed maintenance and replacement of industrial equipment, the accumulated housing deficiencies, relatively large purchasing power due to increase in national income and the liquidation of consumers' installment obligations and debts, and a less serious inflation as compared with the last war.

On the unfavorable side are the difficulties in reconverting industries to peace-time products, which must be on an industry-wide scale, possible shortages of working capital because of reduced earnings, high corporate taxes with little hope of lifting this burden in the post-war years, and an unfavorable cost-price ratio in manufacturing which has been brought about by great rises in both raw materials and labor and small rises in the prices of manufactured products.

All in all these things mean that American industry has a great challenge to face. The industrial and business men of the United States have a big stake in the future and must take an active interest in seeing that our environment is favorable to industrial enterprise.

Realizing this, all who believe in democracy and private initiative must have been heartened by the recent announcement of the formation and plans of the Committee for Economic Development. This is a completely independent and privately financed group of American businessmen and industrialists whose purpose is to plan for a high level of employment and production in the post-war period. Headed by Paul G. Hoffman, president of the Studebaker Corp. the Committee's plans are based on the premise that the United States must be able to provide for fifty-five million jobs by the end of the second year after the war ends, and must produce and sell between one hundred and thirty-five and one hundred and fifty billions of dollars worth of goods and services a year.

Two principal types of effort will be undertaken: research on basic problems of the post-war economy and stimulation of local business groups. Local chairmen have been appointed and committees are now functioning in three cities. Based on the experience in these test cases, plans will be developed for the national program.

To us this seems like a much better way to really get things done, than by letting it go by default to social theorists, government agencies or to have it self-assumed by government representatives. If our post-war world is to be a government sponsored project, it is reasonable to assume that it would be a government controlled project, and we do not believe that America or Americans are suited to such a system.

However, one thing is certain, somebody must do the job, because technological advances surely mean that more people in more countries are going to demand a bigger share in the good things of life. Production for peace will be our next big job. We were unprepared for War, let's not be unprepared for peace!

Container Situation: To say the present container situation in the chemical industry is tough is putting it mildly. But as Donald Knapp, head of the container section, chemicals division of the War Production Board, says in an article beginning on page 206 of this issue, "The possibilities of new developments in the container field are tremendous." There have been some rumors circulating recently regarding steel and steel drums. Some people think that steel is much freer and that steel drums will be readily available and that there is no need to conserve or use substitutes. Don't let them fool you says Mr. Knapp! Open hearth steel is short—very short. We have enough for all of the military needs, and by using a little common sense in using Bessemer steel as much as possible, we will have enough open hearth steel to meet all of the essential civilian requirements. You know as well as we do what is essential.

To help the situation there are many things we in the chemical industry can do. If you use high-pressure gas cylinders you will have to turn them over more rapidly. One manufacturer who averaged two turns a year three years ago on acetylene cylinders now averages nine. You can do it, too. Use paper. Paper bags have been improved during the past year so that they are now stronger, tighter and water resistant. Recently a plywood garbage container hit the market. From all reports, it's a worthy development. Cotton bags have been developed that take the place of burlap and in many cases are a better package than the industry had available before the war. These are only a few of the things. You can name as many more, we know.

Fiber drums have received first call as an alternate container for a great many chemical products. The demand for them far exceeds the supply. Some are water-proofed or otherwise improved as to impermeability by plastic coatings, acid-resistant paints, asphalt, paraffin, and other materials. Latex, formerly used for linings, is unavailable due to the rubber shortage.

Among the chemicals for which steel can no longer be spared is cyanide, itself an essential material in the heat treatment of steels for war. Cyanide is being safely shipped in fiber drums. Dry dyestuffs, arsenate of lead and various insecticide powders have shifted from steel drums and cans to fiber containers. Some of the dry colors in small quantities are going into the familiar cylindrical fiber ice-cream containers.

Black powder, for blasting and for certain military purposes, is soon to go from the familiar steel powder keg into a special keg made of pulpboard (a type of paperboard) which has been water-proofed to meet requirements prescribed by the Du Pont packaging consultant.

Wooden slack barrels seem to be another logical alternative for steel drums for dry products, but they may run into the steel shortage by way of their metal hoops. DNT (di-nitro-toluene), now in slack barrels, may eventually go into fiber drums.

With burlap in tremendous demand and all stocks frozen by the government, the chemical industry has turned to more available substitutes—bags made of cotton sheeting or osnaburg (a strong plain-weave cotton fabric). The cotton bags sometimes require a liner of crinkled kraft paper, which is applied to the fabric with a water-proofing agent.

Multi-walled kraft paper bags, with an asphalt layer or other variations designed to meet the peculiar requirements of the product, are also being used in increasing numbers by the chemical industry. Crystal urea, for example, formerly packed in burlap bags lined with latex-coated white paper, is now in a multi-walled paper bag.

Paints and solvents have been exceedingly hard hit. The shortage first affected the smaller cans. Most of the fractional pint sizes are no longer being shipped at all. Other sizes under a gallon are going into glass jars.

The intermediate packages, from one to 50 gallons, are in a very difficult situation, although wood may eventually carry them through. Some cooperage capacity regularly serving the dairy trade has been diverted to making butter-tub types of containers for paint products. And there may be more relief for 50-gallon quantities in the form of heavy oak barrels, although the adequacy of this supply is yet to be determined.

If the containers problems are successfully solved, sufficient, if not abundant, supplies of paint may be available for 1943.

For the shipping of sulfuric, nitric and muriatic acid, glass carboys and tank cars are still doing the work.

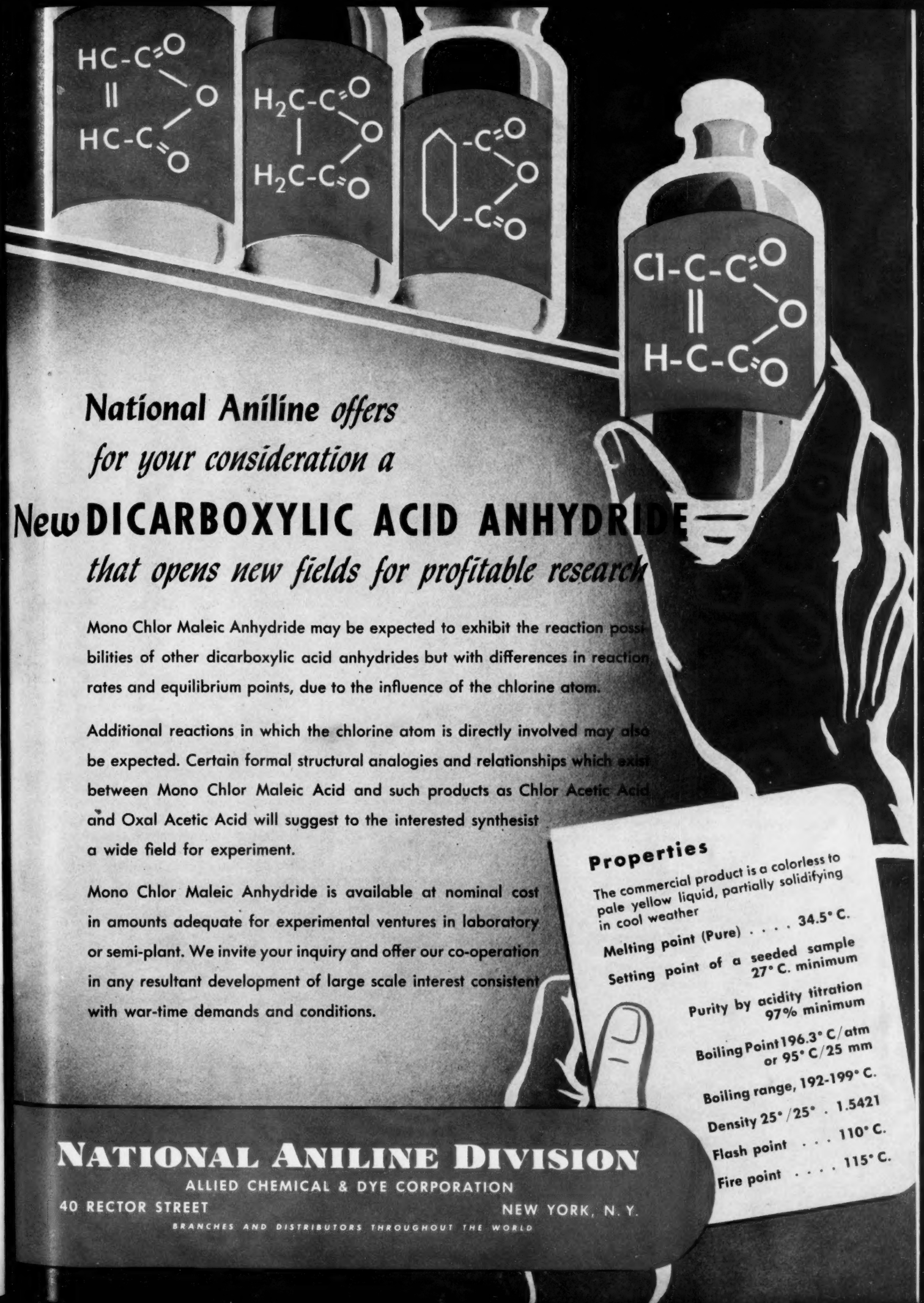
The packaging situation for the chemical industry changes almost day to day, but packaging experts are using every expedient and resource available to keep ahead of shortages and to insure deliveries.

The chemicals division of the WPB established a packaging unit to assist the operating units in getting the essential packages when, and if, needed. The unit simply is a service organization within the WPB. As far as possible, its members try to know what the packaging needs for essential products are and to supply this information to the containers division and the requirements committee. These are your agencies. They are there to help you if you deserve help. We urge your full cooperation.

Scientists of Tomorrow: The second year of world-wide conflict finds the youth of this country affected profoundly by the hysteria that invariably is associated with martial eras. Even the boys and girls of high school age are being subjected to severe mental repercussions. Yet it is from this teen-age group that we must develop the scientists of the not too distant future. If a lively interest in the sciences is not maintained in these times in the minds of our children, then the future outlook is dark indeed.

Programs, such as the Annual Science Talent Search, sponsored jointly by Science Service and Service Clubs of America and Westinghouse Electric and Manufacturing Company, are most helpful in arousing the enthusiasm of the younger generation. Some 15,000 teen-age entrants competed in the latest Talent Search. Aptitude examinations have been given for Westinghouse Science Scholarships which will enable the top-ranking contestants to prepare for future careers as American scientists.

The examination was designed chiefly to measure the student's powers of observation and deduction rather than his knowledge of science. Also it is interesting to note that two of the country's leading psychologists served on the committee of three judges. Obviously the committee was motivated by the idea that scientists must be original thinkers—not merely "bookworms." With this viewpoint it is difficult to disagree. However, far too many of our so-called "examinations" are designed to determine just how much information a student can absorb (perhaps cram is the word) in a set period. Such practice may make for high ratings, but does not necessarily mean that those who obtain such marks are destined to become the leading scientists of tomorrow.



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Density 25°/25° . 1.5421

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BRANCHES AND DISTRIBUTORS THROUGHOUT THE WORLD

Liquid Sulfur Dioxide

By Carl S. Willson, Walter O. Walker, William R. Rinelli, and C. V. Mars
Ansul Chemical Company

A famous chemical manufacturer once summarized his main raw materials as follows: "Salt, lime and sulfur—and the greatest of these is sulfur." Although this element has been known and used since earliest times, it is only recently that one of its compounds, sulfur dioxide, has come into its own. Since the time, thirty years ago, when the mechanical refrigerator created a demand for anhydrous liquid SO_2, its uses have continued to grow. Here is a comprehensive and authoritative story on the manufacture, handling and use of this chemical.

FUMES from burning sulfur have been used from earliest times for disinfecting purposes and sulfur burner gases have long been produced in large quantities for use in the manufacture of sulfuric acid, sulfites and bisulfites, including the sulfite liquors used in the paper industry. Nevertheless, it was only about fifty years ago that Pictet made his first experiments in an attempt to prepare pure liquid sulfur dioxide suitable for use in his early mechanical refrigerator. Interest in this field lagged and it was not until thirty years ago, with the development of the low pressure, mechanical refrigerator suitable for household and small store use, that the demand for liquid sulfur dioxide became sufficient to warrant its production in commercial quantities.

Sulfur dioxide which contained appreciable moisture was early found to be extremely corrosive to ordinary metals and this factor is of unusual importance in the refrigeration industry since the unit, once charged with refrigerant, should function without attention over a period of years. The need for a very dry sulfur dioxide resulted in the demand for, and the production of, a material meeting very stringent specifications. The knowledge and experience so gained have proved of value in meeting the more recent demands for sulfur dioxide to be used in non-refrigeration applications. The technical grade liquid sulfur dioxide supplied today meets specifications more stringent than those set up for most so-called reagent, and chemically, pure grades of chemicals.

As a result of its relatively low price when first offered for sale, reductions in price over a period of years comparable to those of many other new products have been impossible but increased tonnage and refinements in manufacture have permitted some adjustments. Today, liquid sulfur dioxide is one of the lowest priced chemicals available and is finding a growing use not only in new applications of its own and in replacing other chemicals in various processes, but also in displacing "burner gas" in many instances where the apparently greater cost of the liquid sulfur dioxide is more than offset by its instantaneous availability in any desired, variable quantity, its ease of control and introduction into various processes, and its freedom from harmful impurities.

Manufacture of Liquid Sulfur Dioxide

Conventionally, sulfur dioxide has been made by burning sulfur or pyrites, or as a by-product in smelter operations. Because of its abundance in this country, sulfur has been used exclusively in the production of liquid sulfur dioxide although in other countries the more dilute smelter gases have been utilized.

The impure burner or smelter gases are passed into water or other suitable absorbent which serves to dissolve the sulfur dioxide and certain impurities. On heating the solution, sulfur dioxide is driven off by heat after which it is dried and liquefied by methods which vary somewhat with the manufacturer.

Because of the strict specifications originally set up by the refrigeration industry, all liquid sulfur dioxide whether technical or refrigeration grade is regularly tested for moisture, oil, dirt and other impurities. Samples of liquid sulfur dioxide are removed from the storage tank or shipping container and analyzed.

Shipping Containers and Storage Facilities

Liquid sulfur dioxide is shipped in cylinders, drums, and tank cars containing 150 pounds, one ton, and 40,000 or 60,000 pounds, respectively. Other cylinder sizes are available for the refrigeration trade.

All containers are fabricated, tested and filled in accordance with ICC and Bureau of Explosives regulations. Cylinders and ton drums are equipped with fusible metal plugs which melt when 165°F. is attained or exceeded, as from a flame, steam or hot water, to discharge the contents before dangerous pressures can be reached in properly filled containers. Tank cars are provided with a pressure release valve.

Cylinders and ton drums ordinarily serve as storage containers, being retained by the purchaser until the contents have been used. Ton drums are usually shipped on a special railroad car holding 15 drums. The car is unloaded and returned with a load of empty drums in most cases.

When tank cars are used, adequate storage facilities are required since the car must be emptied and returned to the manufacturer promptly.

Handling and Transferring Sulfur Dioxide

Sulfur dioxide is commonly removed from the shipping container (cylinder, ton drum or tank car) and transferred to a measuring chamber, charging board, storage tank or processing equipment as a liquid. Copper tubing, ordinary black iron pipe, or extra heavy black iron pipe and fittings are ordinarily used where moisture is absent.

Where small quantities of gaseous sulfur dioxide are required, they may be removed directly from the upright cylinder or from the upper valve of a ton drum. Since vaporization requires heat, the container must acquire heat from some external source other than the room unless small quantities are used at a time. The container may be warmed by various means, as described below. Where large quantities of gaseous sulfur dioxide are required the liquid is removed from the storage container and vaporized in a special piece of equipment.

Transfer of liquid sulfur dioxide from one container to another is effected by means of a difference in pressure which may be established by heating the container from which the sulfur dioxide is to be discharged, or, less commonly, by cooling the transfer line or the receiving container.

As the liquid in the shipping container or storage vessel is warmed, it expands and, if the volume of the drum is only slightly greater than the volume of the sulfur dioxide, with increasing temperature, the volume of the sulfur dioxide may increase to the volume of the drum. With further temperature increases, the pressure will increase rapidly, the drum expanding within limits and then bursting due to hydrostatic pressure.

The following table shows the volumes of sulfur dioxide at temperatures above 60° expressed in percentage of the volume at 60°F.

°F	Volume of Sulfur Dioxide per cent
60	100.0
80	102.1
100	104.6
120	107.4
140	110.5

The Interstate Commerce Commission specifies the maximum charge for a drum for sulfur dioxide as 1.25 times the full drum water weight.

Care must be taken that valves at both ends of transfer lines are not shut off while the lines are full of sulfur dioxide unless some provision is made to prevent rupture due to hydrostatic pressure if the lines warm up. A gas dome at a high point in the line will usually provide the necessary room for expansion of the liquid.

Care in Heating

When heat is applied to the original container, care must be taken to avoid overheating, since the fuse plugs present in cylinders and ton drums will melt at 165°F. and discharge the containers with attendant loss and odor. It is recommended that the temperature be held at 120°F. or less. Measuring or storage tanks which do not have fusible plugs should not be heated without giving due regard to the possible development of high hydrostatic pressure due to expansion of the liquid sulfur dioxide.

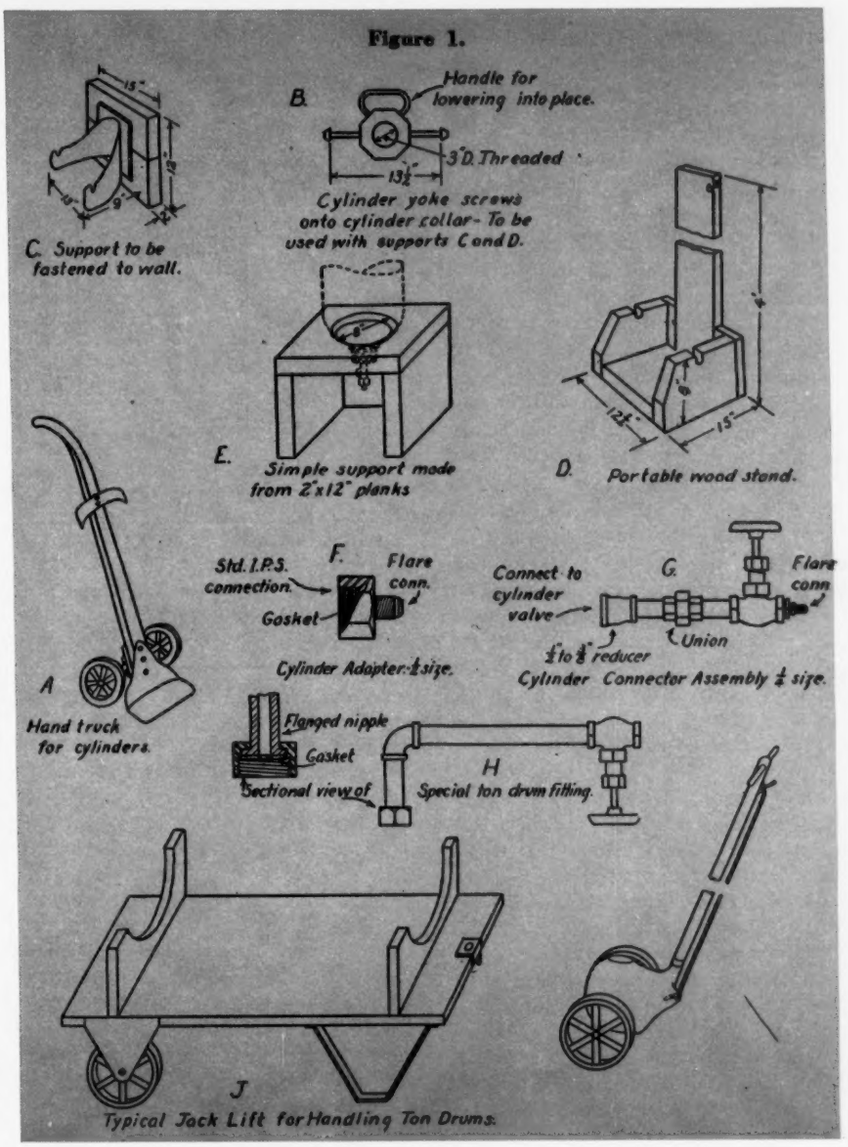
Whenever sulfur dioxide is used, questions arise as to safe and efficient methods of handling containers and in transferring the chemical to storage, measuring tanks or processing equipment.

Handling, Supporting and Connecting Containers

Cylinders—Movement of cylinders from one location to another is most easily accomplished by means of a suitable two-wheeled hand truck as shown in Fig. 1-A. If a truck is not available, the cylinder may be fairly readily moved by tilting to approximately a 20° angle with the vertical, supporting it with one hand on the cap and rolling it at the shoulder with the other. When cylinders are used in the upright position, it is well to chain or tie them to some solid support to prevent tipping.

Cylinders are most easily inverted using the yoke shown in Fig. 1-B, which is threaded onto the top of the cylinder in place of the shipping cap. Using the handle shown on the yoke, the cylinder is lowered and the studs engaged in the slots shown in the metal bracket (Fig. 1-C), or the wooden support (Fig. 1-D). The

Figure 1.



lower part of the cylinder is raised and the cylinder tied or chained to the wall or vertical plank on the portable stand. A simpler although less efficient stand consists of a short length of 2" x 12" plank having an 8" hole and supported as shown in Fig. 1-E. With this support, the cylinder must be inverted while the protective cap is still in place and the cylinder lifted into position.

The simplest form of connector for attaching to the cylinder is the adapter (Fig. 1-F). A fibre washer serves to seal the valve connection and the flare nut connects the copper tubing to the adapter. Since the flare nut must be loosened in changing each connection, this type of connector is less satisfactory than that shown in Fig. 1-G if frequent changes are required. Using this latter equipment, the shut-off valve avoids the necessity of emptying the transfer line and the ground joint union can be opened repeatedly without developing leaks.

Ton Drums—For connecting ton drums to transfer lines, the cylinder adapter of proper size (Fig. 1-F) may be used, although the necessity of loosening the flare nut repeatedly, with consequent possible leakage, limits the application of this fitting. For most applications, a special fitting (Fig. 1-H) incorporating a gasket seal is recommended.

For moving ton drums, particularly when some considerable distance is involved, a truck (Fig. 1-J) is often desirable. Where ton drums are received on multiple unit cars, a monorail system (Fig. 2-B) is usually the most satisfactory means of loading and unloading the drums. Details of the hoist beam and hook are shown in Figs. 2-C and 2-D.

Drums are usually stored on twin rails about 4' apart on which the drums may be rolled to the desired location. Since the drums must be so placed that the two valves are in a vertical line for discharging the contents, a wrench (Fig. 2-E) is desirable for skidding the drum into the proper position. An arrow painted on the outer wall of the drum at the valve end enables the operator to position the valves properly before the shipping cap is removed. This arrow should be at the top.

Tank Cars—To empty the tank car, a 1" iron pipe about 3' long with threads oiled, is screwed tightly into the proper unloading valve (Fig. 4). The other end of this pipe is fitted with a half union which connects to another half union on the loading line. After the union is connected the unloading line is ready for use.

The dry air pressure line used to make the transfer can be ½" pipe stepped up to 1" to fit the valve and is connected to one of the two gas phase valves on the transverse axis of the tank car. These valves do not have a pipe leading to the bottom. They are used in filling the tank car. The same type of connection is used here as in the loading line, that is, an iron nipple with full union.

Flexibility in the unloading line is desirable and a trombone-shaped pipe (i.e. a pipe with several reverse bends) has proved satisfactory. The line leading from the tank car or other container to the storage tank or other equipment should be horizontal or preferably slope downward slightly toward the receiver to facilitate removal of sulfur dioxide from the line on completion of the transfer.

A good quality 1¼" rubber pressure hose (steam hose) can be used for an unloading line, but it should be examined periodically and when the first signs of deterioration appear it should be replaced. With good care a rubber hose should last 3-5 years.

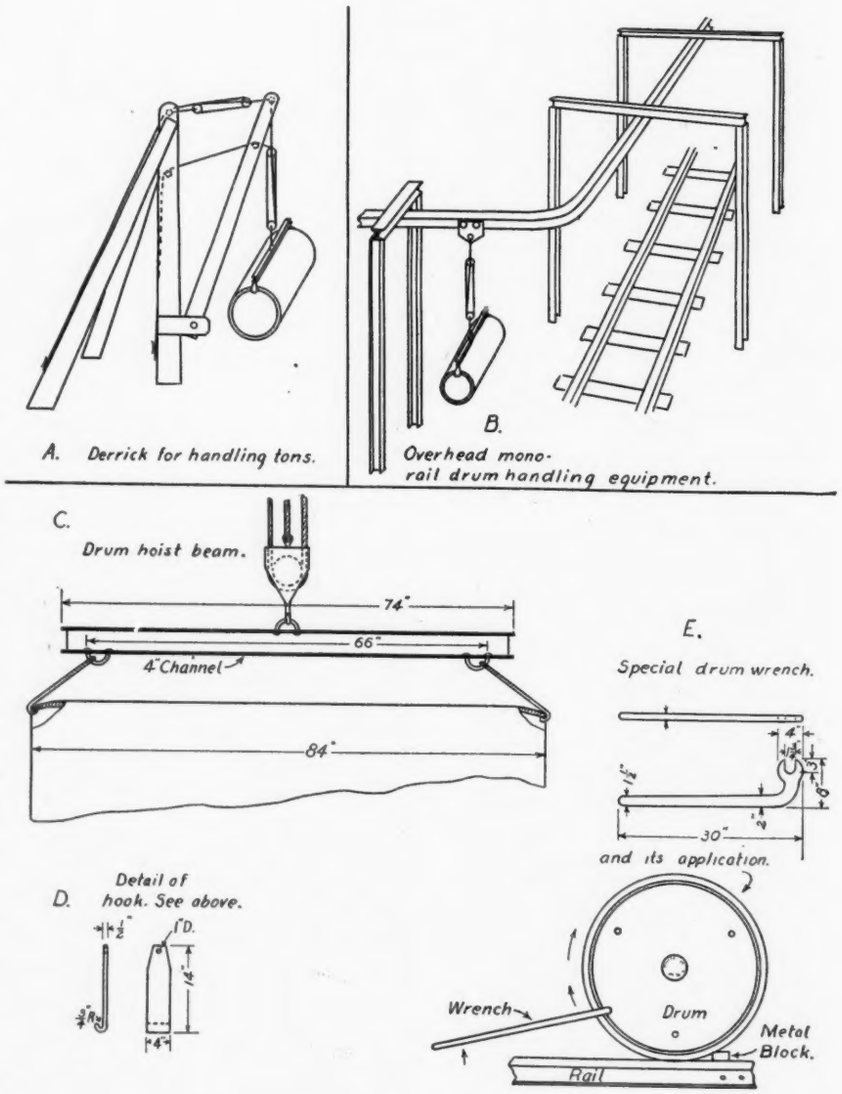
Transfer of Liquid Sulfur Dioxide

By Heating the Container—A very practical and economical way of heating cylinders automatically is with electric strip heaters strapped onto the cylinder. These heaters are equipped with a thermostat which can be set at 100°F. Insulation of the cylinder to prevent heat loss is desirable and can be accomplished by wrapping it with canvas or similar material.

For heating ton drums, a small, well-insulated wooden structure or "doghouse," to accommodate one or two drums, may be constructed (Fig. 3). This structure should be located as close as possible to the point where the drums are unloaded and yet be convenient to the point where the material is to be used. The doghouse is usually constructed on a platform. The drums are supported in the doghouse by rails which are the continuation of the rails on the platform. These rails are installed so that the drums have a slight downward pitch (overall, 1") toward the valve. The construction of the floor of the doghouse will vary depending on the method of heating the drums.

The most common method of heating ton drums is with steam pipes placed on

Figure 2.



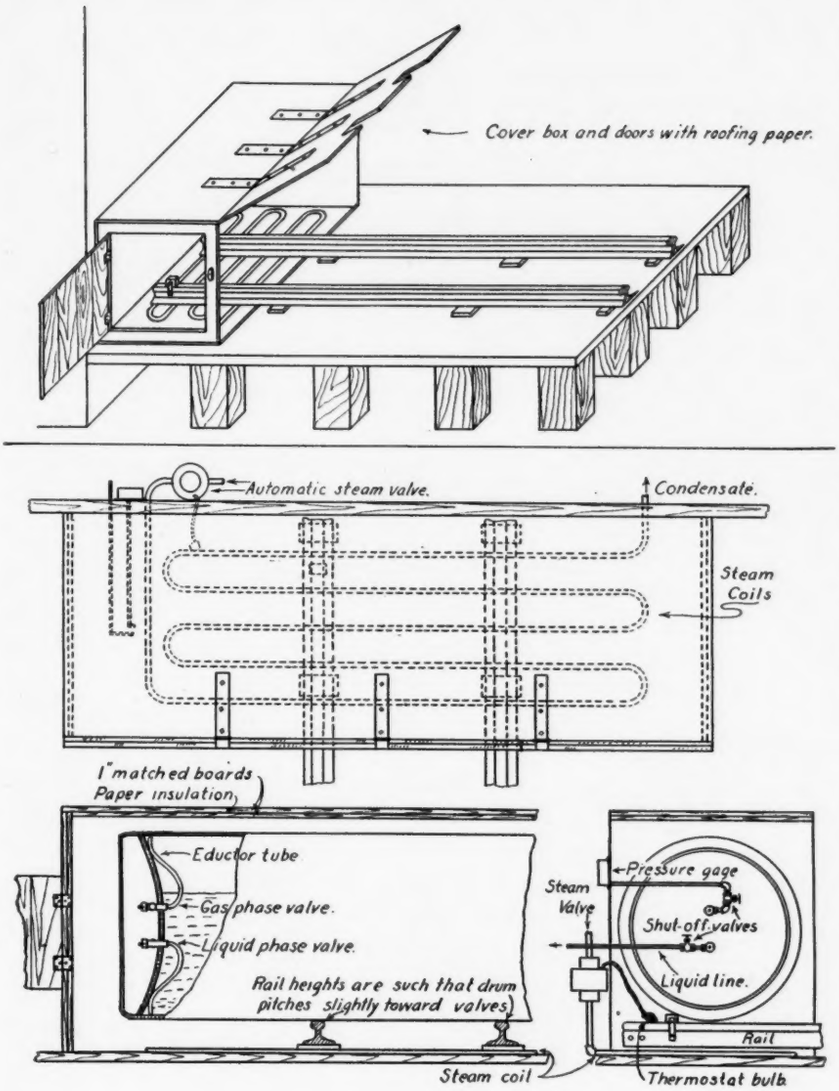


Figure 3.

the floor of the doghouse, directly below the drum. Six or seven 1" diameter steam pipes, running the full length of the doghouse, will furnish sufficient heat. The temperature in the doghouse is controlled automatically, by use of a thermoregulating valve on the steam line. Thermostatically controlled electric strip heaters may be used instead of steam coils. With either type of heating, the thermostat can be placed permanently in some spot in the doghouse which represents an average temperature. Clamping the thermostat on a fuse plug of the ton drum is good practice but necessitates a change for every drum.

In an emergency, ton drums or cylinders may be heated by hot water, steam or even a flame. This method is not recommended, however, since constant attention is required and even then, local overheating may result in melting of the fuse plug with attendant loss of the sulfur dioxide.

By Venting the Receiver—Where moderate quantities of sulfur dioxide are to be transferred under pressure, venting of a small amount of gas from the receiver will lower the pressure (and temperature) sufficiently to cause flow of the sulfur dioxide. Sometimes, a sufficient pressure drop may be created by passing the liquid sulfur dioxide through a water cooled coil or other heat exchanger as it flows from the supply container, thus lowering the temperature and pressure of the liquid entering the receiver. The vented sulfur dioxide may be introduced into the process equipment in some cases or absorbed in a suitable solution.

By Pumping Sulfur Dioxide Gas—In another transfer method, sulfur dioxide is pumped by a suitable compressor from the gas phase of the receiving tank. By thus tending to lower the pressure, some of the liquid refrigerant evaporates and the cooling action helps to establish a lower pressure. The gas discharged from the compressor is introduced into the original container, thus tending to build up pressure and speed the flow of the liquid sulfur dioxide. This method provides for relatively slow transfer and is used only when addition of air must be scrupulously avoided.

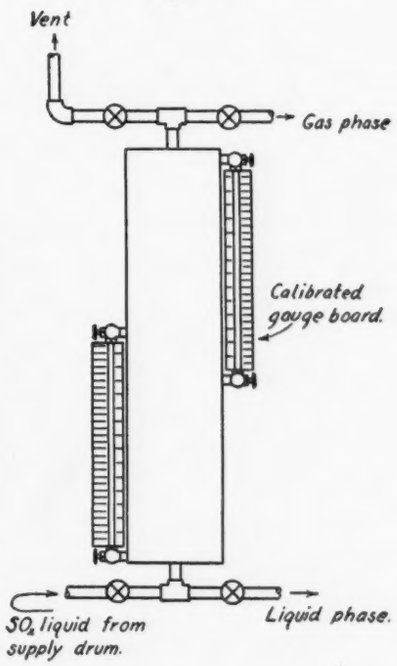
By Air Pressure—Added pressure in a tank car, ton drum or storage tank for transferring liquid sulfur dioxide may be obtained by means of dry compressed air. The compressor should be controlled automatically to maintain the desired working pressure (not over 150 lb.) and should be equipped with a moisture separator (or better still a cooler which will condense most of the moisture out of the air) and a drier. When compressed air is used on ton drums, no doghouse is required except as a means of giving protection against the weather.

Obviously, use of compressed air will introduce non-condensible gases into the liquid sulfur dioxide. Ordinarily, the amount thus introduced is of little practical importance but even this can be largely eliminated by pumping of sulfur dioxide gas rather than air as described in the previous section.

Measuring Sulfur Dioxide

By Weighing—For batch operations when sulfur dioxide is to be taken from a cylinder or ton drum, a platform scale is the most common means of determining the weight of material used. Suspension scales are becoming more popular for weighing ton drums, principally because they are inexpensive and portable. Both beam and dial scales are suitable though the more expensive dial type is more convenient and can be more readily watched from a distance.

Figure 5.



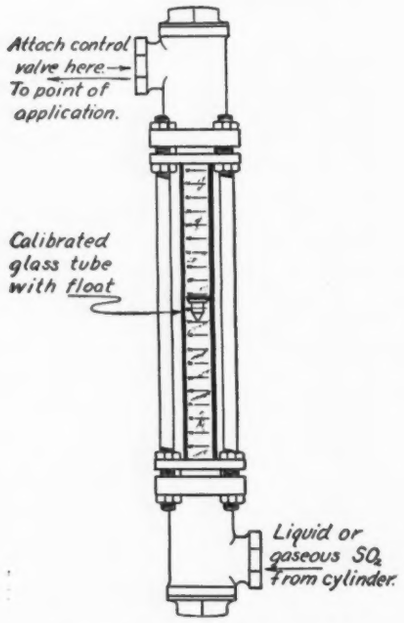
TYPICAL MEASURING CHAMBER.

In connection with some storage tank installations, liquid sulfur dioxide is weighed in a steel pressure vessel which rests on a scale and is connected between the storage tank and the point of application to the process. Flexible connections to the container facilitate weighing. The vessel is filled to the desired weight, or until nearly full, and then the appropriate amount delivered to the desired point.

By Volume—Pressure vessels fitted with calibrated gage glasses are often used for introducing measured volumes of liquid sulfur dioxide into batch processes. The size of the measuring vessel is practically unlimited, depending on the quantity of sulfur dioxide desired and the accuracy of measurement needed (Fig. 5).

By Metering—The rotameter (Fig. 6) is commonly used for continuously metering liquid sulfur dioxide. A rotameter or simple mercury-in-glass flow meter is suitable for measuring the gaseous form.

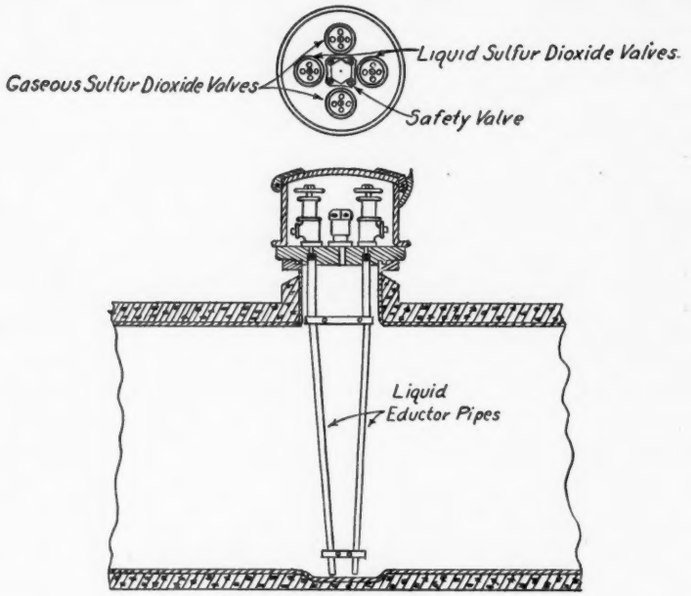
Figure 6.


Attach control valve here
To point of application.
Calibrated glass tube with float
Liquid or gaseous SO_2 from cylinder.

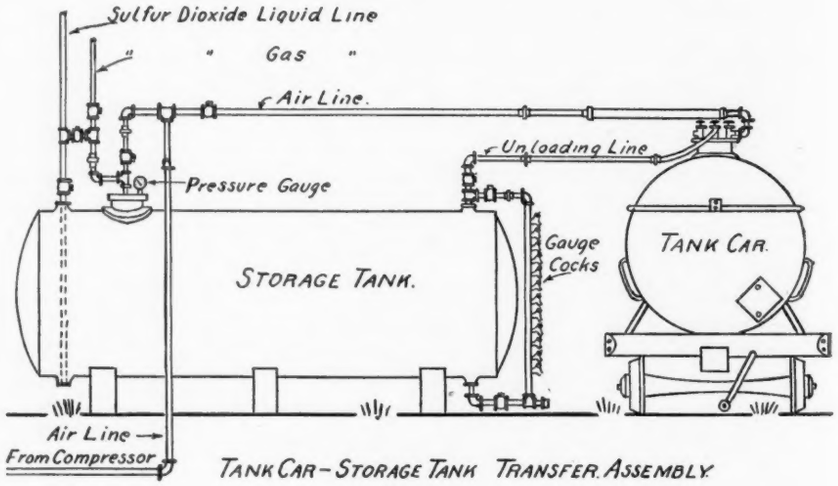
ROTAMETER ASSEMBLY.

By Other Means—In some processes the addition of a sufficient amount of sulfur dioxide is indicated by a color change or pH reading or can be determined by chemical analysis. These methods are rarely satisfactory though they are sometimes used to supplement other means described above.

When it is convenient or desirable to spray liquid sulfur dioxide into process equipment, the most satisfactory means of measuring the amount may make use of a calibrated spray nozzle. Different size nozzles are calibrated at various pressures to deliver definite quantities of sulfur dioxide per unit time. This means of measuring is being used efficiently today in the grain bleaching industry (Fig. 7).



SECTION OF TANK CAR



TANK CAR–STORAGE TANK TRANSFER ASSEMBLY.

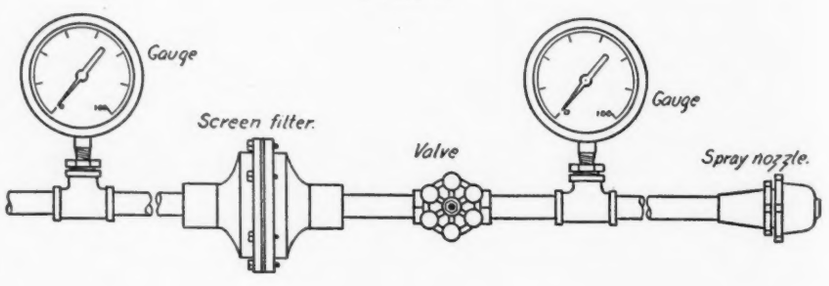
Figure 4.

Pressure Drop in Liquid Sulfur Dioxide Transfer Lines

In determining the carrying capacities of clean, scale-free black pipe for transferring liquid sulfur dioxide and the operating pressures necessary, three factors must be considered.

1—Static Head—This term is due to the weight of a column of liquid and is involved when the receiver is at a different level than the tank from which the liquid is being transferred. Assuming that the liquid sulfur dioxide is at the same tem-

Figure 7.



SPRAY ASSEMBLY

Table I—Miscellaneous Data

Chemical Formula	SO_2
Molecular Weight	64.06
Color (gas or liquid)	Colorless
Odor	Characteristic pungent
Melting Point	—103.9°F. (—75.5°C.)
Boiling Point	14°F. (—10.0°C.)
Critical temperature	314.8°F. 157.1°C.
Critical pressure	1141.5 lbs./sq. in. abs.

perature before and after transfer, approximately .6 lb./sq. in. of *added* pressure will be required in the tank in order to overcome each foot of height which the sulfur dioxide must be raised during the transfer. This term is independent of the size of the pipe.

For more accurate calculations, the difference in density of the liquid sulfur dioxide at various temperatures may be considered. See Table II.

II—Frictional Pressure Drop—This drop in pressure from one end of the pipe to the other is due to friction of the moving liquid and increases with the speed of transfer in a given pipe size, or for a given rate. The frictional pressure drop is greater the smaller the pipe.

Pressure drop may be calculated, with satisfactory accuracy, by means of the formula:

$$\Delta P = \frac{2\ f\ L\ P\ u^2}{gd}$$ where,

f = Friction factor, no units

L = Length of straight pipe, in feet, plus equivalent length due to bends, valves, etc.

P = Fluid density in lb. per cu. ft. = 62.3 x (s)

u = Average velocity of the fluid in ft. per sec. = Discharge as cu. ft. per second / Cross section in sq. ft.

g = 32.2 feet per sec. per sec.

d = Actual inside diameter in feet

ΔP = Pressure drop in lb. per sq. ft.

D = Actual inside diameter in inches

s = Specific gravity, no units

z = Viscosity relative to water at 68°F. (centipoises)

FRICTION FACTORS

F	f	F	f	F	f
.14- .16	.014	1.80- 1.89	.0072	15.1- 17.5	.0043
.17- .20	.0135	1.90- 2.05	.0071	17.6- 20.0	.0042
.21- .26	.013	2.60- 2.25	.0070	20.1- 22.0	.0041
.27- .33	.0125	2.26- 2.40	.0069	22.1- 24.5	.0040
.34- .37	.012	2.41- 2.50	.0068	24.6- 26.5	.0039
.38- .40	.0115	2.51- 2.60	.0067	26.6- 33.0	.0038
.41- .43	.011	2.61- 2.75	.0066	33.1- 37.0	.0037
.44- .46	.0105	2.76- 2.95	.0065	37.1- 41.0	.0036
.47- .54	.010	2.96- 3.20	.0064	41.0- 47.0	.0035
.55- .58	.00975	3.21- 3.40	.0063	47.1- 51.0	.0034
.59- .68	.0095	3.41- 3.55	.0062	52. - 70.	.0033
.69- .72	.00925	3.56- 3.75	.0061	71. - 78.	.0032
.73- .82	.0090	3.76- 4.10	.0060	79. - 85.	.0031
.83- .86	.0089	4.11- 4.25	.0059	86. -105.	.0030
.87- .89	.0088	4.26- 4.50	.00585	106. -120.	.0029
.90- .92	.0087	4.51- 4.75	.0058	121. -140.	.0028
.93- .95	.0086	4.76- 5.00	.0057	140. -210.	.0027
.96- .97	.0085	5.00- 5.30	.0056		
.98-1.05	.0084	5.31- 5.70	.0055		
1.06-1.14	.0083	5.71- 6.10	.0054		
1.15-1.20	.0082	6.11- 6.50	.0053		
1.21-1.24	.0081	6.51- 7.05	.0052		
1.25-1.35	.0080	7.06- 7.50	.0051		
1.36-1.42	.0079	7.51- 8.10	.0050		
1.43-1.47	.0078	8.11- 8.80	.0049		
1.48-1.53	.0077	8.81- 9.50	.0048		
1.54-1.61	.0076	9.51-11.0	.0047		
1.62-1.68	.0075	11.1 -12.0	.0046		
1.69-1.74	.0074	12.1 -13.2	.0045		
1.75-1.79	.0073	13.3 -15.0	.0044		

The term "f" is determined from a graph plotted in terms of the factor $\frac{Dus}{z}$ (which for convenience we will refer to as F).

In the case of drawn copper pipe or its equivalent, for values of F larger than .14 the fluid flow is turbulent and the value for f is taken from the following table. Values for iron pipe differ but slightly from those given, the pressure drop being slightly higher but the difference is of little importance for practical purposes.

For streamline flow, minor irregularities in the surface are of even less importance and for values of F less than 0.14, f is calculated from the equation

$$f = \frac{0.00207}{F}$$ for all types of pipe

For values of F less than 0.14, $f = \frac{0.00207}{F}$

III—Velocity Head—This term corresponds to the pressure required to convert the stationary liquid to moving liquid. It is independent of length of pipe and for most flow rates cited in the previous section is negligible. For some of the higher rates, the pressure drop is about 1-2 pounds and hence is of little consequence compared with the frictional pressure drop and thus can be omitted without serious error.

Table II Vapor Pressure, Density and Heat Content of Sulfur Dioxide

Temperature °F.	Pressure Lb./sq. in. Abs.	Pressure Lb./sq. in. Gage	Density Lb./cu. ft. Liquid	Density Lb./cu. ft. Saturated Vapor	Heat Content above —40° Btu/lb. Liquid	Heat Content above —40° Btu/lb. Latent	Heat Content above —40° Btu/lb. Vapor
—40	3.136	23.54	95.79	0.04460	0.00	178.61	178.61
—30	4.331	21.10	94.94	.06039	2.93	176.97	179.90
—20	5.883	17.93	94.10	.08119	5.98	175.09	181.07
—10	7.863	13.91	93.27	.1025	9.16	172.97	182.13
0	10.35	8.85	92.42	0.1374	12.44	170.63	183.07
10	13.42	2.59	91.58	0.1760	15.80	168.07	183.87
20	17.18	2.48	90.71	0.2228	19.20	165.32	184.52
30	21.70	7.00	89.76	0.2800	22.64	162.38	185.02
32	22.71	8.01	89.58	.2909	23.33	161.77	185.10
40	27.10	12.40	88.81	0.3464	26.12	159.25	185.37
50	33.45	18.75	87.87	0.4259	29.61	155.95	185.56
55	37.05	22.35	87.41	0.4708	31.36	154.24	185.60
60	40.93	26.23	86.95	0.5194	33.10	152.49	185.59
65	45.13	30.43	86.50	0.5717	34.84	150.70	185.54
70	49.62	34.92	86.02	0.6290	36.58	148.88	185.46
75	54.47	39.77	85.52	0.6907	38.32	147.02	185.34
80	59.68	44.98	85.03	0.7570	40.05	145.12	185.17
85	65.28	50.58	84.54	0.8285	41.78	143.19	184.97
90	71.25	56.55	84.05	0.9058	43.50	141.22	184.72
95	77.60	62.90	83.57	0.9890	45.20	139.23	184.43
100	84.52	69.82	83.07	1.080	46.90	137.20	184.10
105	91.85	77.15	82.57	1.176	48.88	135.14	183.72
110	99.76	85.06	82.03	1.281	50.26	133.05	183.31
115	108.02	93.32	81.46	1.394	51.93	130.92	182.85
120	116.54	101.80	80.90	1.515	53.58	128.78	182.36
125	126.43	111.73	80.35	1.645	55.31	126.51	181.82
130	136.48	121.78	79.81	1.787	56.85	124.39	181.24
135	147.21	132.51	79.23	1.947	58.47	122.15	180.62
140	157.71	143.01	78.61	2.102	60.04	119.90	179.94

Corrosion by Sulfur Dioxide

Liquid sulfur dioxide, as supplied by the manufacturer, is one of the purest chemicals sold and contains only traces of moisture. As such, this chemical is not corrosive to ordinary metals such as

iron, copper, brass, aluminum, etc. Galvanized pipe is to be avoided since the zinc tends to react with sulfur dioxide containing very small quantities of moisture.

Slight discoloration of the common metals occurs when the moisture content exceeds 0.03% and slight scaling results if 0.10-0.15% moisture is present. At a concentration of 0.15-0.20% or more, moisture in the sulfur dioxide will result in the formation of a heavy scale and serious corrosion.

Where wet sulfur dioxide or solutions corrosive to ordinary metals are encountered, certain stainless steel and other alloys may be used. Glass, wooden, enameled or plastic lined equipment has been found to be corrosion resistant in some applications.

Leak Detection

Due to its characteristic odor, comparatively small leaks of sulfur dioxide are easily detected. Even the smallest leaks are readily located by means of an ammonia swab. A small piece of cloth or sponge may be secured to a wire and dipped into a strong solution of ammonia (such as household ammonia) and then passed over points where leaks may be present; a dense white smoke forms where the sulfur dioxide and ammonia fumes come in contact. Under special circumstances, leaks may be located by placing a soap solution or oil at the suspected point. Bubbles will appear in case a leak is present. Small leaks may also be detected by odor or by testing with moist blue litmus paper.

Hazards Due to Leaks

Because of its pungent characteristic odor, serious accidents due to the use of sulfur dioxide are rare. When breathed in small quantities, the gas produces no harmful effects beyond a possible irritation of the nose and throat similar to that of a cold. This irritation lasts but a short time. When larger concentrations are encountered, a person involuntarily holds his breath and seeks fresh air. Since the effects of inhaling sulfur dioxide are not cumulative, no ill effects beyond temporary discomfort are to be expected.

In the event that liquid sulfur dioxide comes in contact with the skin, a freezing action may occur. Gradual restoration of temperature as in frostbite is followed by treatment as for a burn.

In the case of serious freezes, exposure to high concentrations of gas, or injury to the eyes, a physician should be consulted immediately.

Sulfur Dioxide Solutions

Sulfur dioxide solutions find application in a wide variety of industries and processes, and are most conveniently prepared by use of liquid sulfur dioxide. When sulfur dioxide is added to water or other liquids, the amount absorbed will depend on the absorbent liquid, the temperature, the pressure on the system, and whether or not reaction occurs.

Sulfur dioxide is soluble to a considerable extent in various organic liquids such as alcohols, amines, nitrobenzene, mineral oils, etc., in some cases being miscible in all proportions and in other instances forming definite chemical compounds which may or may not be soluble in the original liquid.

Organic and inorganic substances are soluble to varying extents in liquid sulfur dioxide but two layer systems often form and may be the basis for means of purification of various materials. In the case of water at room temperature, a two layer system forms in which the upper layer contains 49.1 parts of sulfur dioxide per 100 parts of water while the lower layer contains 2.3 parts of water per 100 parts of sulfur dioxide.

Data relating to water solutions of sulfur dioxide are shown in Tables III and IV.

Table III—Saturated Sulfur Dioxide Solutions

Temperature °C.	Temperature °F.	% Sulfur Dioxide	Lbs. Sulfur Dioxide per gallon of water
0	32	22.83	1.91
4	39.2	19.98	1.67
10	50.6	16.21	1.35
15	59.0	13.54	1.13
16	60.8	13.05	1.09
17	62.6	12.59	1.05
18	64.4	12.14	1.01
19	66.2	11.70	.976
20	68.0	11.29	.942
21	69.8	10.89	.909
22	71.6	10.50	.877
23	73.4	10.13	.846
24	75.2	9.76	.815
25	77.0	9.41	.785
30	86.0	7.87	.656
35	95.0	6.46	.540
40	104.0	5.41	.452

Preparation of Sulfur Dioxide Solutions

Sulfur dioxide solutions are readily prepared by introducing either the liquid or gas into the bottom of a suitable container by means of a perforated pipe as shown in Fig. 8. In another method, liquid sulfur dioxide is introduced into a flowing stream of water by means of a special valve (Fig. 9). This method has found special favor in the cherry brining industry, for example, where accurately metered quantities of sulfur dioxide are introduced into a given amount of water used to charge the barrel containing the fruit (see illustration, page 186).

The concentration of sulfur dioxide in solution can often be determined by a simple iodine titration although other methods, some of which involve distillation of the sample may be required for colored solutions or those containing interfering constituents.

Uses of Liquid Sulfur Dioxide

Liquid sulfur dioxide can be used for all applications where burner gas is utilized and in many cases where freedom from impurities, need for accurate control and other factors preclude the use of burner gases. In several instances where a choice is possible, liquid sulfur dioxide is replacing burner gas on a strictly cost basis since the smaller amount of liquefied gas used, together with the improved final product, more than offsets the apparently greater cost per pound.

Use of sulfur dioxide for treating a particular substance in general is predicated on its properties as a solvent, as a fumigant and preservative, or on its chemical properties as a bleaching agent, a reducing agent (and under some circumstances as an oxidizing agent) or as a reagent for the preparation of chemicals and other products.

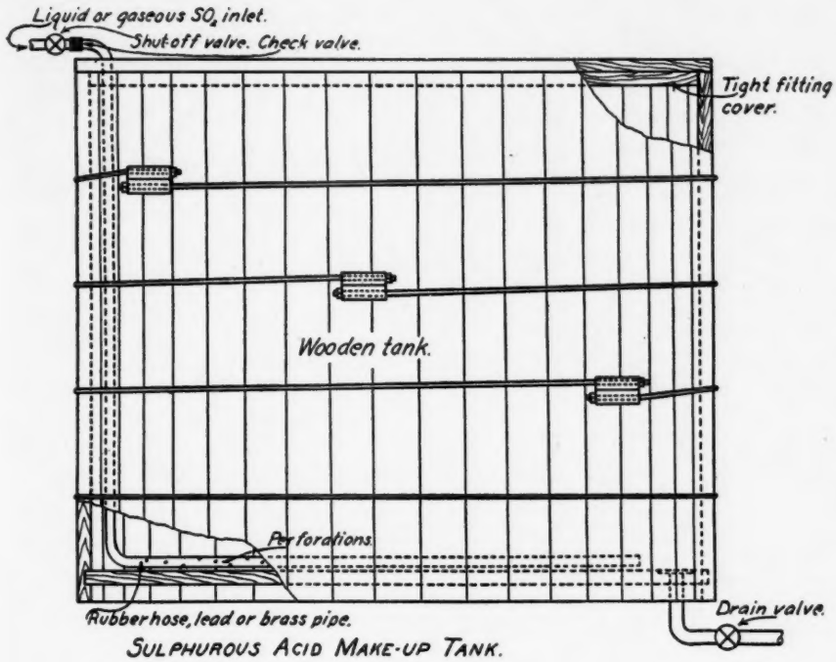
Solvent—Liquid sulfur dioxide possesses marked solvent properties for a great many organic substances and to a lesser extent for inorganic materials.

Petroleum Products—Use of liquid sulfur dioxide in the petroleum refining industry began some 25 years ago with the introduction of the Edeleanu process. This method of purification is based on the fact that aromatic and unsaturated hydrocarbons are miscible in all proportions with liquid sulfur dioxide while saturated hydrocarbons, particularly at low temperatures, are but partly miscible. Auxiliary solvents for use in combination with liquid sulfur dioxide have been proposed and include such substances as alcohols, acetone, chlorobenzenes, etc. Separations of other organic compounds have also been proposed.

In some instances, sulfur dioxide has

Table IV—Quantities of Sulfur Dioxide Required for Various Concentrations of Sulfur Dioxide in Water Solutions

% Sulfur Dioxide	Specific Gravity at 60°F.	Sulfur Dioxide Required per Gal. of solution	Sulfur Dioxide Required per 100 Gals. of solution
0.5	1.002	2/3 ounce	4 lbs. 3 oz.
1.0	1.004	1-1/3 "	8 " 5 "
1.5	1.0065	2 "	12 " 8 "
2.0	1.009	2-2/3 "	16 " 11 "
2.5	1.0115	3-1/3 "	20 " 13 "
3.0	1.014	4 "	25 " 0 "
3.5	1.0165	4-2/3 "	29 " 3 "
4.0	1.019	5-1/3 "	33 " 6 "
4.5	1.0215	6 "	37 " 8 "
5.0	1.024	6-2/3 "	41 " 11 "
6.0	1.029	8 "	50 " 0 "
8.0	1.039	10-2/3 "	66 " 11 "
10.0	1.049	13-1/3 "	83 " 6 "



SULPHUROUS ACID MAKE-UP TANK.

Figure 8.

been added as a distillation auxiliary to permit separations not otherwise possible, or to precipitate a constituent and thus permit its ready removal.

Coal and Related Materials—For extracting binding substances from coal, liquid sulfur dioxide has been used, sometimes in combination with a material such as benzene or acetone. It has also been proposed to use liquid sulfur dioxide for extracting tar and shale-oil distillates, montan wax and anthracene. Montan resin is claimed to be soluble whereas the wax is insoluble. Anthracene may be separated from carbazole.

Wood Pulp, Cellulose, etc.—In addition to its well-known use in sulfite liquors, for preparing wood pulp, sulfur dioxide in liquid form has been suggested as an extractive agent for treating chipped wood prior to cooking to dissolve out turpentine and rosin and permit a shorter cooking period.

In various processes involving treatment of cellulose and its esters, the marked solvent properties of liquid sulfur dioxide for these materials have proved of interest. One unusual application involves "exploding" cellulose acetate, by suddenly releasing the pressure from a liquid sulfur dioxide solution. Rapid gassing of the sulfur dioxide causes precipitation of the acetate in a fluffy form very satisfactory for further treatment.

Resins and Similar Materials—In addition to being used as a catalyst or component in the manufacture of various resins, liquid sulfur dioxide can be used to dissolve certain resins for purification or other purposes.

Animal and Vegetable Products—Liquid sulfur dioxide has been proposed as a solvent for extracting oils, fats, alkaloids and other constituents from a wide variety of natural products. One of the most interesting possibilities now in process of development involves use of sulfur dioxide for extracting oils from materials such as soy beans. Removal of impurities from rosin and similar materials can be effected by liquid sulfur dioxide extraction.

Reaction Solvent—Recent interest has centered in the use of liquid sulfur dioxide as a medium for affecting condensations of the Friedel-Crafts type, the claim being that formation of tars and other side reactions are minimized. Isomerization reactions, such as those resulting in modification of the properties of drying and semi-drying oils, may be carried out to advantage in liquid sulfur dioxide. Sulfonation reactions resulting in the formation of detergents, wetting agents, textile assistants and a variety of other products can be carried out advantageously in liquid sulfur dioxide according to recent studies.

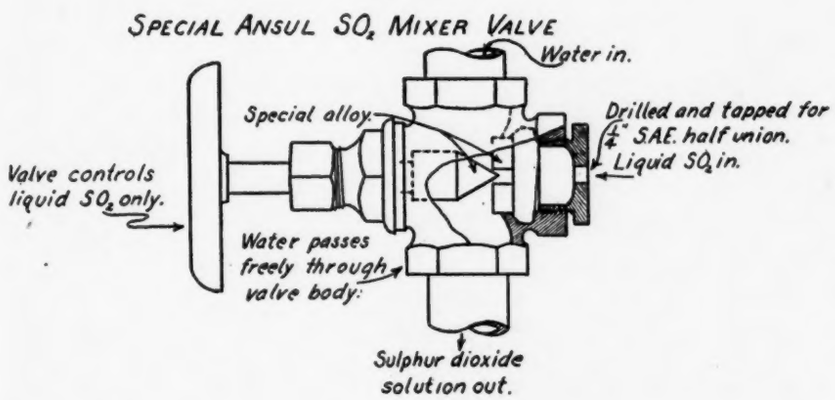
Food Industries—Liquid sulfur dioxide, because of its purity and ease of handling and control, is replacing burner gas in many applications in addition to serving in processes where burner gases can not be used. In general it finds uses as a fumigant, a preservative and a bleaching agent. In many cases, the sulfur dioxide combines two or more of the above functions as in grain treatment where use is made of the fumigating and bleaching properties of the chemical.

Fumigation—In the treatment of certain fruits which are subject to rapid spoilage, fumigation by sulfur dioxide is effective in destroying molds and other microorganisms responsible for decay and putrefaction. Grapes, for example, which are to be shipped to distant markets or held for future use in wine, juice or other processing operations will remain in satisfactory condition for longer periods if fumigated with sulfur dioxide.

In the preparation of fruit juices, wines and syrups, sulfur dioxide plays an important role in preventing undesired fermentation. Used as a preservative in fruit juices, it destroys the molds, yeasts and acid forming bacteria which lead to spoilage of the juice. In the wine industry, sulfur dioxide is regularly used to destroy molds, bacteria and wild yeast prior to introduction of the pure yeast culture necessary for sound fermentation.

Where food supplies become infested with weevils, rats or other vermin, fumigation of the warehouse containing the food may prove desirable. Cereals and grains are particularly well suited to fumigation by means of sulfur dioxide. Grains such as wheat or oats, for example, if of poor appearance can usually be brightened by proper treatment with sulfur dioxide at the same time that infestations are being eliminated. Undesirable tastes in soybean products may be destroyed by sulfur dioxide, and soybean proteins processed using sulfur dioxide as a precipitating agent.

Figure 9.


SPECIAL ANSUL SO_2 MIXER VALVE
Water in.
Special alloy.
Drilled and tapped for ¼" SAE. half union.
Liquid SO_2 in.
Valve controls liquid SO_2 only.
Water passes freely through valve body.
Sulphur dioxide solution out.

Bleaching—Sulfur dioxide is used as a bleaching agent in the refining of sugar, treatment of grain, fruits, etc.

Apple slices or other fruit for use in the bakery and confectionery trade may be treated with sulfur dioxide gas, or preferably by dipping in a water solution to prevent undesirable discoloration or "browning." Fruit to be dried has a lighter color if "sulfured" prior to other treatment.

Drying and Dehydration—Sulfur dioxide has long been used to advantage in the sun drying of various types of fruits and more recently in the artificial dehydration processes where standardization and need for accurate control has made the use of liquid sulfur dioxide particularly desirable. Rather recently, the preservative effect of sulfur dioxide for Vitamins A and C in fruits and fruit juices has been recognized. Under the impetus of war demands, this application is of growing interest.

Brining—Use of liquid sulfur dioxide for preparing preservative brines for treating cherries, berries and other fruits provides easy control of the purity and concentration of solutions. Export demands at present are augmenting this use. In the preparation of maraschino cherries, not only the preservative action of the sulfur dioxide is important, but also the bleaching effect which gives a uniform light color to the fruit prior to dyeing.

Chemical Manufacture—Liquid sulfur dioxide is regularly employed in the manufacture of a variety of chemicals where burner gas is unsuitable. It may also be used under some circumstances to replace burner gases where the factors of purity and ease of handling so indicate, as in the manufacture of sulfites, bisulfites, etc.

Hydrosulfites (dithionites) are prepared by introducing liquid sulfur dioxide into a suspension of zinc dust with formation of zinc hydrosulfite from which the other salts may be made. Hydrosulfites find applications of considerable importance in sugar refining, dye stripping, textile printing, paper manufacture and elsewhere, due to the powerful reducing action of the chemical. Sulfoxylates and formaldehyde sulfoxylates, made from hydrosulfites, also find application in the textile industries.

Sulfuryl chloride, Thionyl chloride—These chemicals are produced from liquid sulfur dioxide and serve as chlorinating agents and for other purposes in a variety of applications.

Sulfonic Acids, Sulfones, etc.—A wide variety of organic chemicals can be produced by treatment of various organic liquids with sulfur dioxide. With many unsaturated hydrocarbons, sulfur dioxide will react to form sulfones which have great potentialities as resins. Sulfonic acids, sulfonyl chlorides and many other types of materials may be formed by proper selection of starting materials and reaction conditions.

Miscellaneous Uses in Various Industries

Paper and Pulp—Although liquid sulfur dioxide cannot compete with burner gas for the normal preparation of sulfite liquor, it does serve as a fortifying agent to increase the strength of the liquor or to replace burner gases in an emergency. It also serves as an antichlor or to give an "acid-flash bleach" to the final pulp. Hydrosulfites have been used in pulp bleaching to some extent.

Proteins—Sulfur dioxide solutions are used to extract proteins from materials such as soybeans and by variation of the acidity, may also precipitate the protein at a later stage. Soybean protein and casein, as well as other related products, are lighter in color and possess desirable characteristics when sulfur dioxide has been used in their preparation. Bleaching of proteins by hydrosulfites is also advantageous.

Water Purification—As an anti-chlor, sulfur dioxide is effective for accurately adjusting the residual chlorine in water supplies and is of value in the treatment of boiler feed water, and in the cleaning of water filter beds and wells.

Resins and Plastics—Sulfur dioxide is an effective catalyst and reagent in imparting desirable characteristics to various types of resins and plastic materials. With olefins, it forms plastics of potentially great interest.

Leather and Glue—Sulfur dioxide has been used extensively for the preparation of chrome liquor for tanning leather. The solutions so prepared are of uniform, known concentration and possess characteristics not found in the liquors prepared by reducing the chromium salts by other means. Hydrosulfites have been suggested as bleaching and conditioning agents for the hides as well as the finished leather.

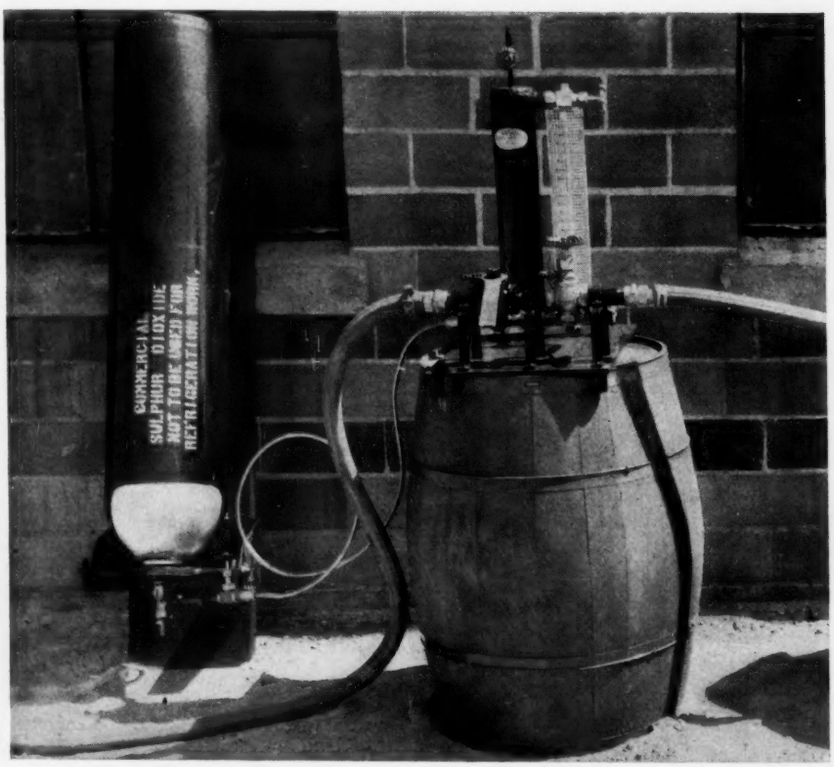
Sulfur dioxide is used as a bleaching agent and preservative for glue and gelatine.

Textiles—Bleaching of textiles and other fibers often involves the use of sulfur dioxide or hydrosulfites.

Minerals—Sand, clay and other minerals may in some instances be bleached by solutions of sulfur dioxide or hydrosulfites.

Refrigeration—As stated previously the initial market for liquid sulfur dioxide was the refrigeration industry where the demand has been large and continuing through the past 25 years because of the ideal thermodynamic properties, stability, non-inflammability and non-explosive properties of the material. Low cost, and the fact that the gas serves as its own warning agent, have resulted in the use of sulfur dioxide in upwards of 15 million household and other small refrigerators.

Unit for Preparing Sulfur Dioxide Solutions.



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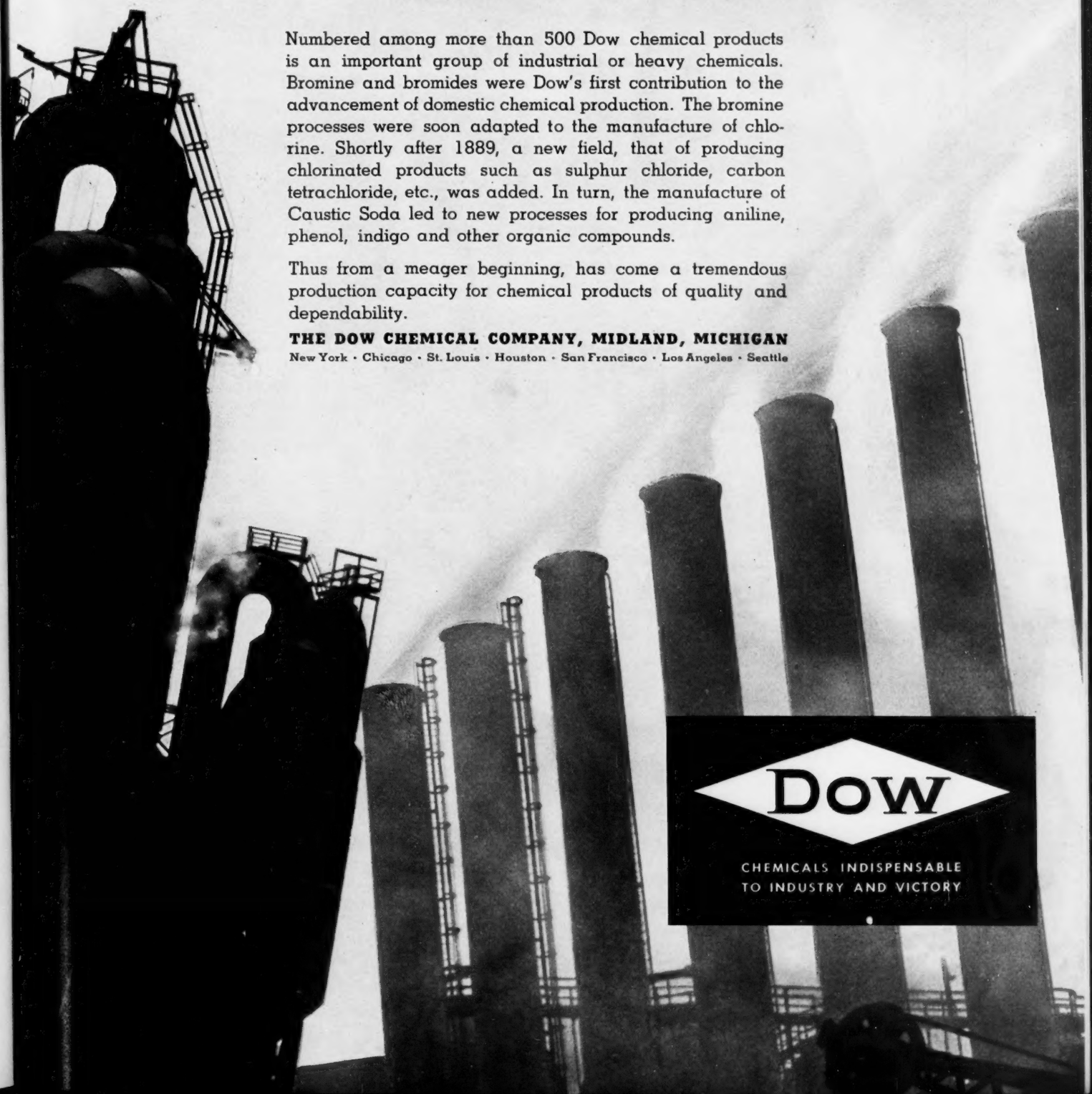

Numbered among more than 500 Dow chemical products is an important group of industrial or heavy chemicals. Bromine and bromides were Dow's first contribution to the advancement of domestic chemical production. The bromine processes were soon adapted to the manufacture of chlorine. Shortly after 1889, a new field, that of producing chlorinated products such as sulphur chloride, carbon tetrachloride, etc., was added. In turn, the manufacture of Caustic Soda led to new processes for producing aniline, phenol, indigo and other organic compounds.

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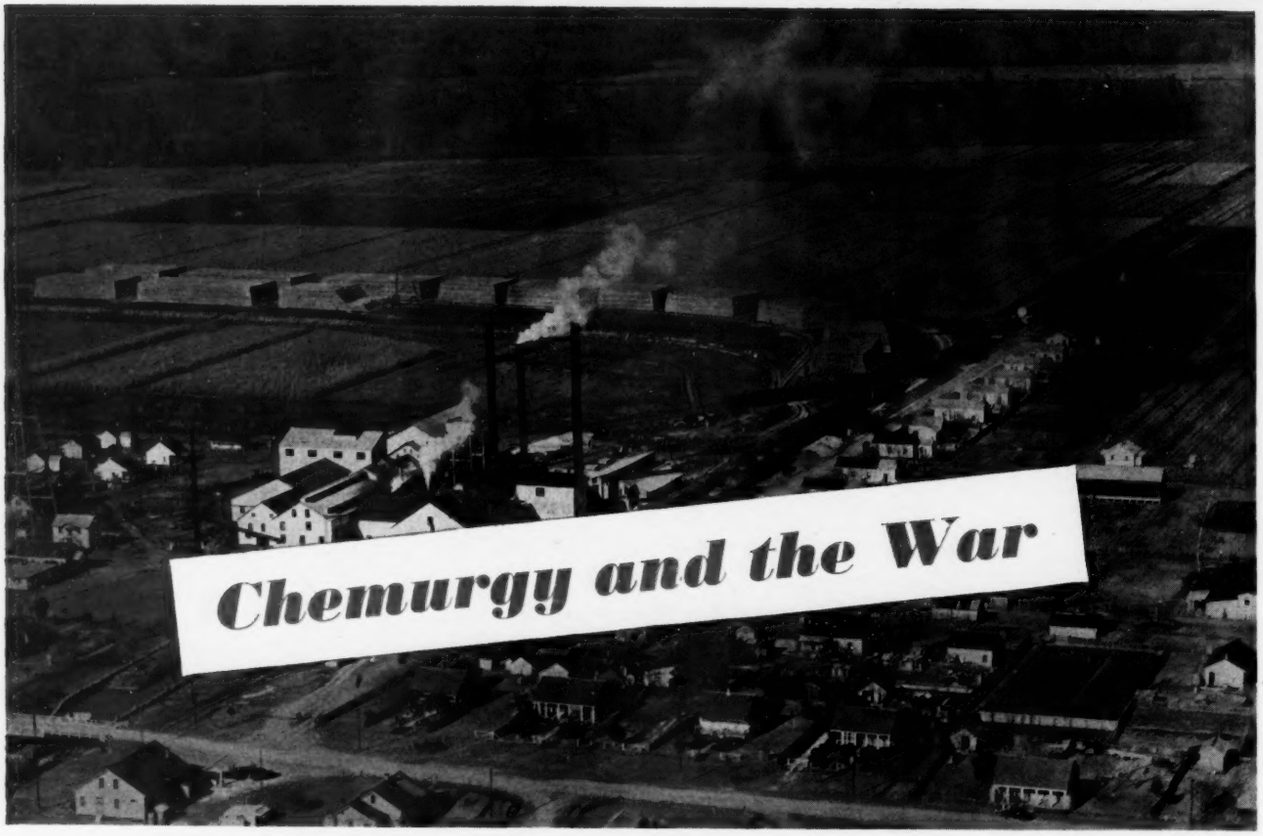


Chemurgy and the War

Aerial photo of Valentine Sugars' Plant in Louisiana.

By Robert S. Aries
Polytechnic Institute, Brooklyn, N. Y.

The object of chemurgy is the advancement of the industrial use of farm products through applied science. In this article our author discusses some of the recent progress in this important field of endeavor.

THE mine, the oil well, the forest and the farm supply the raw materials from which the sinews of war are forged. In contrast with the mine and the oil well, the farm and forest have yet to be brought to a comparable peak of utilization. The industrial utilization of farm products and by-products has tremendous potentialities for its resources are renewed annually and will, therefore, be called upon more and more to supplement the exhaustible materials.

The agricultural waste cellulosic materials alone amount to over 200 million tons[4] per year. This is potentially[6] 30 million tons of furfural plus 80 million tons of cellulose plus 60 million tons of lignin per year. In comparison with these figures it is interesting to note that the 1942 production of steel in the U. S. was 80 million tons, and that of crude petroleum was 250 million tons. The 1942 production of furfural was 2500 tons. Because it is useful in butadiene purification, the demand for 1943 will be 12,000 tons, but even the latter figure is a small fraction of one per cent of the above mentioned potential source. The waste cellulose could represent a substantial contribution to the paper and pulp industries. The value of lignin in the strategic plastics industry is given below. It might also be worthy of note that lignin stands ready to become the source of 15 million tons of vanillin, a raw material for the synthetic medicinal and food industries. In this war as in no other, the farmer's crops through the chemical engineer have emerged as a potential source of strategic raw materials for the essential chemical industries.

Wartime demands should not be hampered by ordinary economic principles—these are not ordinary times. We have been compelled to become a wartime nation and any resource or process which will help to keep our grabbag full should receive welcome attention.

Alcohol and Synthetic Rubber

Much has been written and said about the relative merits of petroleum and alcohol as the source of butadiene for synthetic rubber. For the present it is sufficient to state that availability of raw materials, cost of plant, and speed of getting into production makes grain butadiene worth investigation. Both processes can contribute greatly and quickly to the production of butadiene, which is the slow reaction limiting the rate of the production of synthetic rubber.

From grain, in particular, corn, butadiene can be made by either of two processes. The corn can be converted first to anhydrous alcohol or 2, 3-butylene glycol. The butylene glycol process resembles the alcohol process up to the stage where the sugars are formed. The steps in the conversion of alcohol and 2, 3-butylene glycol into butadiene are shown in figures 3 and 4 on page 259.

The chemistry of the alcohol and glycol conversions is shown in equations 1 and 2.

1. $2\ CH_3\ CH_2OH \rightarrow 2\ H_2O + H_2 + C_4\ H_6$
2. $CH_3\ CHOHCHOHCH_3 \rightarrow 2\ H_2O + C_4\ H_6$

The yields of butadiene per ton of corn given in tables 1 and 2 are based on the latest available information.[8] It might be well to point out that the alcohol process has been tested thoroughly on a commercial scale in Russia and Poland, while the glycol process is still in the laboratory.

The butadiene required for next year is 750,000 tons which on the basis of Table 1 would require 268 million bushels of corn. The normal surplus, or the corn in federal granaries plus the normal supply of culls runs much higher than this figure. It might be pointed out also that workers at Fordham University claim that a way has been found to convert the pentosans of corn into alcohol and workers at Iowa State College have developed a bread mold that gives a higher yield of alcohol per bushel than the usual malt preparation. These developments may be expected to have a revolutionary effect on the economics of alcohol butadiene in the future.

Table 1

Alcohol Method

	Gals. anhydrous alcohol–bu. corn	*Gals. anhydrous alcohol–ton corn*	*Lbs. anhydrous alcohol–ton corn*	*Lbs. butadiene–ton corn**
Yields ...	2.8	100	660	200

* The 78% pure butadiene has been recalculated here as to 100% butadiene.

Table 2

Glycol Method

	Lbs. glycol per ton corn	*Lbs. glycol per ton corn*
Yields	400	200

The glycol process would require 270 million bushels of corn. The product is said to be the "purest butadiene yet." This is important as the purer the butadiene, the better the synthetic rubber. Construction of pilot plants for butadiene from butylene glycol, one of them being capable of producing one ton per day has been started. It is estimated that plant construction will take six to eight months, a relatively short time. The shortest construction time estimated for the Houdry process plants is 9 to 10 months.

Cost estimates, as complete as wartime secrecy permits, are given in Tables 3 and 4. Plant cost for the alcohol process is estimated at $500 per ton of finished synthetic rubber.[7a]

Table 3

Raw material cost of butadiene

	Alcohol Process	*Glycol Process*
Lbs. butadiene per ton corn	200	200
Cents per lb. of butadiene for $.85 corn	$15.50	$15.00

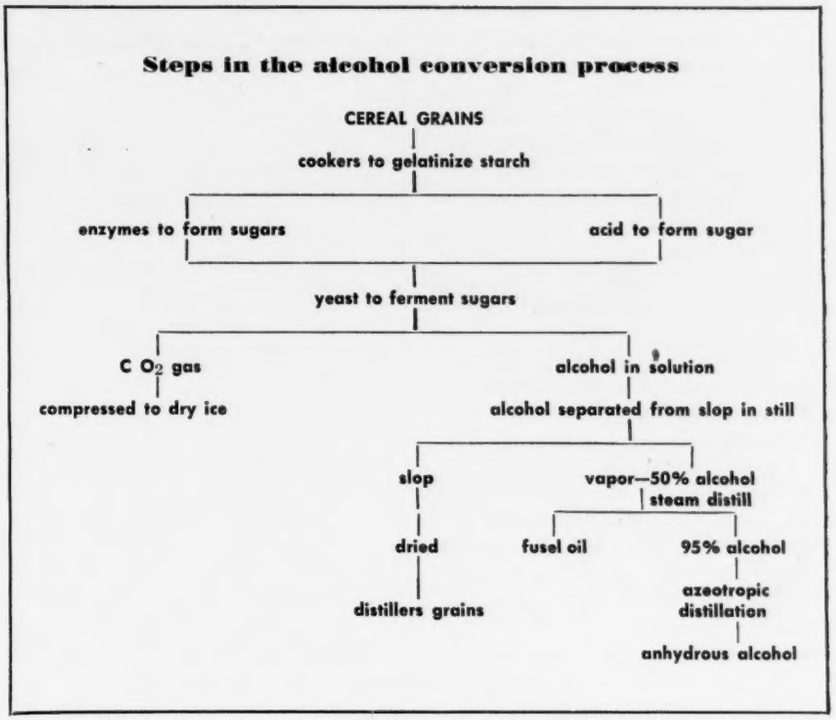
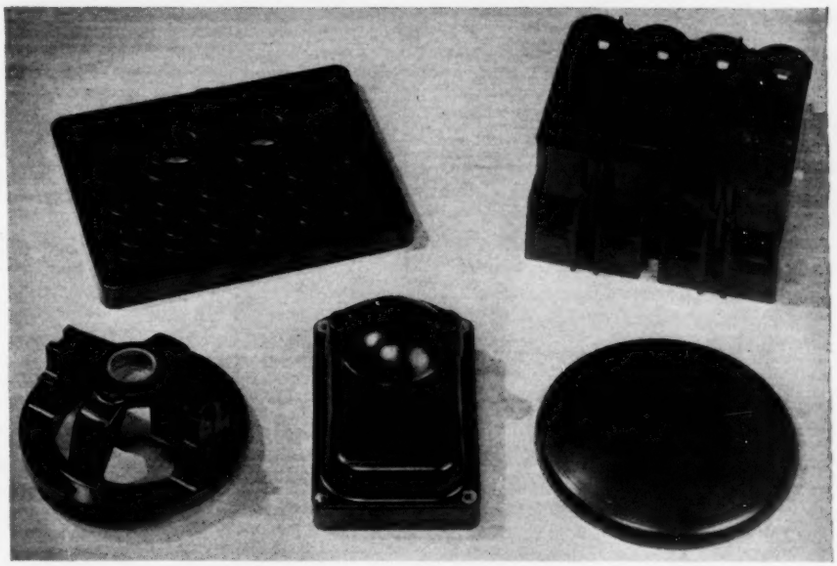


Figure 1

Since a complete accounting of the net cost of butadiene from the glycol process cannot be divulged[13] at this time, only a comparison of material costs for the alcohol and glycol methods is given in Table 3. Butadiene made from the glycol is considerably better suited to the emulsion polymerization technique already established in this country than the alcohol butadiene. The alcohol butadiene has to be put through additional steps of purification. As stated previously, the alcohol process has the advantage of an established commercial history, whereas the glycol process has yet to be tested on a commercial scale. However, the latter is reputed to show enough promise to be worth future consideration. Its adoption depends entirely on what the laboratory workers can pull out of the hat to convince the governments as to its feasibility for large scale production.

Products made from bagasse molding compounds of Valentine Sugars.



Plastics From Agricultural By-Products

Despite the very large need for plastics for military and civilian uses, many molds are laying idle, an undesirable situation in view of the potentialities of the enormous tonnages of the annual farm crop residues as a raw material for their manufacture.

It is no easy matter to bridge the gap between the laboratory development of these natural products and their economic production on a commercial scale. One of the major obstacles to success with plastics from agricultural by-products has been their slower and less uniform flowing and curing properties as compared with those of synthetic resins. However, under the present circumstances, a longer molding cycle is preferable to no molding cycle at all. If this handicap plus the fact that their manufacture also requires the utilization of some scarce chemicals, are overcome, we shall see this year a real progress in the industrial conversion of these agricultural residues.[11]

Cost of butadiene from alcohol, corn at $.85

ITEM	Cents per gallon anhydrous alcohol	Cents per pound alcohol *	Cents per pound butadiene
Fixed costs	$ 2.78	.....	.....
Operating costs	4.60	.....	.....
Corn	30.40	.....	.....
Malting materials	3.73	.....	.....
Processing	5.68	.....	.....
Gross cost for alcohol	$47.19	.....	.....
Credit for feed at $35 per ton	7.81	.....	.....
Net cost of alcohol	$39.38	$ 5.97	.....
Fixed costs for butadiene per pound	.....	.....	Note 13
Operating costs	.....	.....	Note 13
Catalyst	.....	.....	Note 13
Processing	.....	.....	Note 13
Alcohol	.....	.....	$14.93
Gross cost	.....	.....	Note 13
Credits for by-products	.....	.....	$ 1.35
Net cost of butadiene†	.....	.....	$13.58

* Adapted from reference 8.

† The net cost for the butadiene does not include processing, operating and catalyst costs, nor the extra step of purification required to produce butadiene suitable for emulsion polymerization.

Table 4

Table 5

Raw material costs of corncob plastics

Thermoplastic material:

350 lbs. corncobs @ $.005 per lb.	$ 1.75
460 lbs. cresol @ $.11 per lb.	49.50
38 lbs. sulfuric acid @ $.01 per lb.	.38
Total raw material cost, 525 lb. yield.	51.63
Filler, 800 lbs. @ $.01 per lb.	8.00
Total material cost, (1325 lbs.)	59.63
Raw material per lb.	.045

Thermosetting molding powder:

175 ibs. corncobs @ $.005 per lb.	8.75
230 lbs. cresol @ $.11 per lb.	25.30
19 lbs. sulfuric acid @ $.01 per lb.	.19
38 lbs. hexa @ $.35 per lb.	13.30
30 lbs. calcium hydroxide @ $.05 per lb.	.15
24 lbs. aluminum stearate @ $.20 per lb.	4.80
500 lbs. filler @ $.01 per lb	5.00
90 lbs. furfural @ $.10 per lb.	9.00
Total	66.49
Raw material cost per lb.	.062

An attempt at utilization of by-products on a commercial scale has been undertaken by several progressive firms as well as government agencies and colleges. At the Polytechnic Institute of Brooklyn, Dr. P. F. Bruins has worked for a number of years on plastics from bagasse, while Dr. O. R. Sweeney and L. K. Arnold at the Iowa State College are two of the pioneers in the study of the utilization of Corn Belt wastes for this purpose.

The cellulose, lignin, protein and pentosans of corncobs can all be used in the manufacture of plastics. By treatment with phenol and sulfuric acid, Sweeney has been able to produce a plastic product without first separating the furfural. The process involves cooking at 90 lbs. pressure and molding at 2,000 lbs. and 220° C. The moisture absorption of this plastic, containing asbestos filler was found to be as low as 0.02 per cent. Addition of hexamethylene tetramine gives a mixture that is thermosetting in a 3 minute cure at 3000 lbs. and 190° C.

Plastics By Hydrolysis

Considerable work has been done in recent years on the hydrolysis of wood and wood wastes for the purpose of obtaining plastics and plastic extenders.[1] There is no fundamental reason why agricultural wastes with a similar chemical composition could not be utilized in the same manner.

Sweeney and Arnold obtained a hydrolyzed cornstalk plastic with excellent strength, good appearance and good water resistance. Thus, equal parts of hydrolyzed cornstalks, furfural, and aniline yielded a plastic with only 0.34 per cent water absorption.

The 450,000 tons of sugar cane bagasse which will be readily available in 1943 for utilization at sugar plants are very suitable for conversion into plastics as they contain 60 per cent cellulose, 20 per cent

Table 6

Average of certain physical characteristics of plastics produced from sugar cane bagasse.

Treatment of Raw Materials		Yield of Digested Material (basis oven-dry bagasse) %	Flexural Strength (Modulus of Rupture) lb./sq. in.	Izod Impact Strength (Energy Absorbed) notched ft.-lb.	Izod Impact Strength (Energy Absorbed) unnotched ft.-lb.	Moisture Absorption (basis oven-dry molded product) %	Specific Gravity	Hardness (Shore Schleroscope)	Bulk* Factor	Moisture in Air-dry Molded Product %
Acid† Hydrolysis	Max.	..	6983	....	....	3.37	1.42	87	...	1.27
	Min.	..	5805	....	....	2.29	1.42	83	...	.38
	Avge.	65	6349	....	....	2.69	1.42	85	...	.80
Aniline‡ Hydrolysis	Max.	..	6900	.254	.618	2.99	1.38	90	5.23	.86
	Min.	..	3175	.074	.155	.64	1.28	71	2.50	.07
	Avge.	90	4650	.120	.254	1.27	1.34	83	3.42	.270
Soda-Furfural§ Hydrolysis	Max.	..	5982	....	....	4.04	1.41	81	...	1.12
	Min.	..	5560	....	....	3.57	1.41	81	...	.97
	Avge.	79	5771	....	....	3.81	1.41	81	...	1.04
Commercial Phenol-Formaldehyde	1	..	7063	....	....	.34	1.34	98	...	.25
	2	..	7107	....	....	.42	1.41	95	...	.23
	3	..	6898	....	....	.38	1.38	95	...	.24

* Ratio of volume of finished powder to volume of molded product.
† Digested material plasticized with aniline and furfural.
‡ Digested material plasticized with furfural, furfural and aniline, or furfural and phenol.
§ No plasticizers added.

Estimated Cost of raw materials for the production of bagasse molding powders

	Type of Bagasse Powder					
	Acid-Hydrolyzed		Aniline-Hydrolyzed		Soda-Furfural Digested	
	Quantity Required	Cost	Quantity Required	Cost	Quantity Required	Cost
RAW MATERIALS	*lb.*	*$*	*lb.*	*$*	*lb.*	*$*
Bagasse, oven dry, at $8.00 per ton	2630	10.52	1900	7.60	2165	8.66
Sulfuric Acid, 66°, at $16.50 per ton	27	.22	....	....	910	7.41
Caustic Soda, 76%, at $2.30 per cwt.	....	....	....	....	660	15.18
Aniline at $.15 per lb.	135	20.25	535	80.25	135	20.25
Furfural at $.10 per lb.	135	13.50	135	13.50	395	39.50
Zinc Stearate at $.35 per lb.	17	5.95	17	5.95	17	5.95
Total cost per ton of plasticized powder	....	50.44	....	107.30	....	96.50
Cost per lb. of plasticized powder	....	.025	....	.054	....	.04

Table 7

lignin and 28 per cent pentosans. Bagasse is in a good position for potential usage as the cost of initial collection and defibering has already been absorbed in the manufacture of sugar. Less than half of the bagasse available is utilized mainly for structural and insulating board, the bulk being burned as fuel.

Bagasse does not appear to be a satisfactory filler for phenolic resins. However, a good molding composition can be obtained by means of an acid, alkaline furfural or aniline digestion.[2]

A summary of the results of this investigation is given in Table 6.

Despite their longer molding cycle resulting in an increased cost of labor, molds and presses, the overall costs for bagasse moldings should be less than the overall costs of synthetic resins on account of the cheap source of raw material.

The costs of raw materials as given by Aronovski and Clark are presented in Table 7.

Several sugar companies are also conducting research on bagasse molding compounds, Valentine Sugars and Godchaux being among the more prominent. Thermosetting compounds with a short curing time, good flow and finish have already been offered on the market.[8] A filler has been developed from bagasse which has been found to be superior to woodflour in combination with the bagasse resin.

The molding powders are dark and partially thermosetting, being soft when ejected from the molds. Some properties of this resin as reported by McElhinney are given in Table 8.

A good laminating resin has been made from bagasse. Valentine Sugars has also developed a semi-thermoplastic resin made without any priority material and consisting of approximately 70 per cent processed bagasse.

Table 8

Physical properties of 3 typical bagasse plastic compounds

COMPOUND	*A*	*B*	*C*
Molding quality	Excellent	Excellent	Good
Molding temperature, °F.	300–350	300–350	300–375
Molding pressure, p. s. i.	2000–3000	2000–3000	2000–10,000
Compression ratio	2.5	2.5	3.0
Specific gravity	1.35–1.40	1.35–1.40	1.30–1.40
Flexural strength, p. s. i.	8900	9500	10,160
Impact strength, unnotched Izod, ft. lb., ½ in. x ½ in. bar	1.10	1.00	1.39
Resistance to heat, °F.	350	380	400
Dielectric strength, volts per mil, step	250	...	...
Water absorption 48 hour, per cent.	0.90	0.75	...
Burning rate	Very low	Very low	Very low
Effect of age	Apparently none		
Effect of weak acids	Slight		
Effect of alkalies	Slight surface roughening, 168 hr. boiling with 25% NaOH		
Effects of organic solvents	None, to a slight surface roughening		
Effect on metal	Inert	Inert	Inert
Colors	Dark	Dark	Dark

Table 10

Comparison of raw material costs

Standard Phenolic Compound		*Cottonseed Meal Compound*	
1 part phenolic resin	$ .1451	1 part phenolic resin	$ .1451
1 part cottonseed hulls	.0060	1 part cottonseed hulls	.0060
		1 part cottonseed meal	.0292
2 part compound	.1511	3 part compound	.1803
Cost per pound	.0756	Cost per pound	.0601

Difference in raw material cost, 20.5 per cent.

Cottonseed Meal In Phenolic Plastics

While casein used to be the only industrially important protein plastic, vegetable proteins have also been subject to investigations which can be applied in the present emergency.

Cottonseed meal decreases the flow of phenolic compounds when substituted for an inert filler and affords a reduction of 20.5 per cent of the raw material cost, although it changes its other properties too.[10] The results of these investigations are given in Tables 9 and 10.

Table 9

Comparison of properties of standard phenolic vs. cottonseed meal plastic

	Commercial Phenolic Compound Resin: Filler = 1.1 by wgt.	*Cottonseed Meal Compound Resin: Filler: Meal = 1:1:1 by wgt.*
Flow, in 2000 lb. sq. in., 340° F.	1.50	.70
Water absorption, % in 24 hr.	.22	.80
Flexural strength, lb. sq. in.	11,560	9800
Impact (Izod), ft.-lb. to break	.31	.26

Protein Plastics

The dairy industry, so vital in itself, produces about 55 billion pounds of by-products which find industrial uses. Commercial casein is prepared from skim milk by means of rennet or an acid. The latter type is used in paper coating to bind the clay or other pigment, while rennet casein is used almost exclusively for the manufacture of plastics. Casein production in 1943 is expected to be around 65 million pounds while the consumption may be close to 100 million pounds, Argentina being the largest foreign supplier.

Certain vegetable proteins such as that contained in soybeans can be used for plastics instead of casein. Because of the

rapid development of the soybean oil industry in the United States, soybean meal is available in large quantities. The expected production for 1942 was over 3 million tons of meal with about 50 per cent protein content. The latter can either be extracted from the meal for use in plastics or the whole meal may be used allowing the nonprotein matter to remain as a filler.

Sweeney and Arnold have studied the production of soybean meal-furfural plastics and obtained a thermoplastic product which they molded in a 6 min. cycle at 2000 lb. per sq. in. at temperatures up to 200° C. A dark brown resin was produced by heating soybean meal, furfural, phenol, and ammonium hydroxide. This resin, when mixed with a filler was molded into products which compared favorably in strength and water absorption with samples molded from common phenolic molding powders. Urea was substituted for the phenol and produced a substance of satisfactory strength but higher water absorption. Soybean meal was also hardened by furfural alone and molded into a product of good strength but high absorption.

Table 11

Raw material cost of soybean plastics

A. Resin	
Furfural, 30 lbs. @ $.10 per lb.	$ 3.00
Phenol, 24 lbs. @ $.15 per lb.	3.60
Ammonium hydroxide, 4 lbs. @ $.025 per lb.	.10
Soy bean meal, 32 lbs. @ $.02 per lb.	.64
Lime, 3 lbs. @ $.005 per lb.	.02
Total for 74 lbs. resin	7.36
Cost per lb.	.099
B. Molding Powder	
Resin, 100 lbs. @ $.99 per lb.	$ 9.90
Wood flour, 100 lbs. @ $.02 per lb.	2.00
Hexa, 4 lbs. @ $.35 per lb.	1.40
Aluminum stearate, 6 lbs. @ $.20 per lb.	1.20
Total	14.50
Cost per lb.	$ .0725

On account of the high water absorption, further work is necessary in order to produce a soybean compound suitable for applications in which this property is essential.

Rubber Substitutes, Casein, and Adhesives

A material has been prepared from corn oil and soybean protein on a laboratory scale that "looks, smells, and feels" much like rubber. It has a tensile strength of 500 pounds per square inch and 200 per cent elongation. These figures compare favorably with some of the synthetic rubbers, but a complete evaluation of all the properties of corn oil and soybean rubber is lacking.

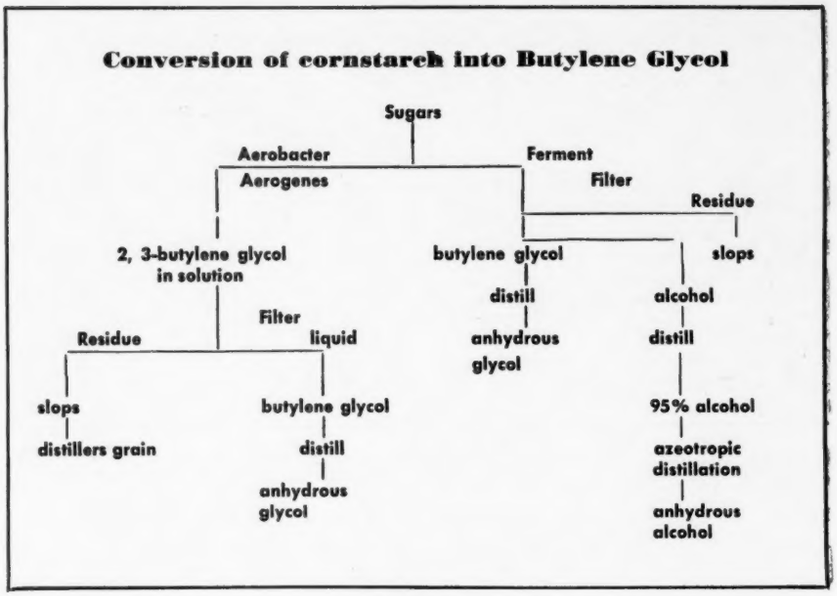


Figure 2

The corn millers have their hands full processing the oil necessary as a food, but the grain available for milling is considerably greater than that being used at present. About 120 million bushels are processed annually, yielding 125 million pounds of oil. Corn products are already performing the Allies a great service both in making rubber substitutes and extenders and drying oils, but their rate could be considerably extended. Only the inedible oil (20% of the total) need be used to make these products. A tremendous need has been developed for the oil, giving impetus and encouragement to the comparatively small milling industry. All in all, the milling of corn could serve to help take up any existing surplus.

The demand for glue and adhesives of all kinds exceeds the supply. The supply of animal glues, casein, and phenol-formaldehyde has been considerably reduced by the war. Soybean meal, cornstarch, corn pro-protein(zein) all provide glues which are satisfactory war substitutes. Soybean glue is very successful in bonding plywood while corn glue works well on paper products.

Nicotine

The 200 million pounds of tobacco wastes available annually should be mobilized for war-time uses. There will be a shortage of about half a million pounds of nicotine in 1943 on account of its constantly increasing use in the manufacture of nicotinic acid (niacin), its use to replace derris and pyrethrum as well as its agricultural use for greater food production.

The principal methods used in the recovery of nicotine are water extraction, solvent extraction and steam distillation. The latter is largely used in this country, although it is cumbersome on account of the very large volume of distillate that has to be handled, the maximum concentration of nicotine being 4 per cent. Recently, several new and more advantageous forms have been developed, such as nicotine sulfate, inorganic and organic salts, double salts and complexes.

Despite the restricted imports of pyrethrum, an obligation exists to provide 6 million farmers in the United States with the insecticides and fungicides required to fight insects and diseases, if we expect certain food crops to be adequate for domestic consumption, the armed forces and Lend-Lease requirements.

Other uses for tobacco wastes include that of a denaturant for alcohol, in the fields of medicine and veterinary science as well as in the manufacture of fertilizers which absorbs large tonnages.

Industrial Solvents and Chemicals

Farm surpluses and wastes can and are contributing greatly to our stores of vital solvents and chemicals. The list includes: (1) Alcohol, (2) Butyl alcohol, (3) Acetone, (4) Glycerine, (5) Furfural, (6) Vanillin, (7) Butylene glycol. Alcohol and butylene glycol have already been treated. A yield of 1.5-2 gallons of butyl alcohol and acetone per bushel of grain is obtained by fermentation. These solvents are vital to the paint, lacquer, rayon, and explosives industries. The economics will be discussed in part two of this article. Glycerine, necessary for the manufacture of nitroglycerine, can be made by the fermentation of the starches.

The shortage of furfural, needed for the purification of butadiene, is well known. The only commercial source is pentosan, of which the farm has a plentiful supply in the form of waste oat hulls, peanut hulls, cornstalks and cobs, bagasse, cot-

(*Continued on page 259*)

ALKYL PHOSPHORIC ACIDS

1. ETHYL PHOSPHORIC ACID
Specific gravity: 1.33 at 25° C
Color: pale straw-colored liquid.
Alkyl acid content: approximately 97%.

2. NORMAL BUTYL PHOSPHORIC ACID
Specific gravity: 1.24 at 25° C.
Color: fluorescent reddish amber.
Alkyl acid content: approximately 99%.

3. AMYL PHOSPHORIC ACID
(a pentasol derivative)
Specific gravity: 1.33 at 25° C.
Color: fluorescent reddish amber.
Alkyl acid content: approximately 99%.

4. METHYL PHOSPHORIC ACID
Specific gravity: 1.439 at 25° C.
Color: pale straw-colored liquid.
Alkyl acid content: approximately 97%.

5. NORMAL PROPYL PHOSPHORIC ACID
Specific gravity: 1.30 at 25° C.
Color: reddish amber.
Alkyl acid content: approximately 97%.

SUGGESTED USES

1. As catalysts in the manufacture of urea resins... Ind. Eng. Chem. 33 512-15 (1941).

2. As materials for forming water-insoluble coatings on metals for rust or corrosion prevention. U. S. Pat. 2224695.

3. As polymerizing agents for drying oils, resins, etc., as outlined in U. S. Pat. 2223548.

4. Metallic salts of these alkyl phosphoric acids show promise as flame-proofing compounds for fabrics and paper... as alternates for glycerin in vat printing pastes... and as fiber lubricants for wool spinning. Ind. Eng. Chem. 34 20-25 (1942).

How can these recently developed alkyl phosphoric acids help solve a problem for you?

Patents have been issued which indicate their value as catalysts and polymerizing agents in the manufacture of synthetic resins... as polymerizing agents in the processing of drying oils... and as water-insoluble, rust and corrosion-proofing compounds. In addition, their metallic salts have also shown promise in several different fields. While the raw materials situation makes supplying of commercial quantities of these alkyl phosphoric acids uncertain at present, experimental quantities are available. For samples, simply fill out the coupon below. MONSANTO CHEMICAL COMPANY, Merrimac Division, Everett Station, Boston, Massachusetts.

MONSANTO CHEMICALS
SERVING INDUSTRY...WHICH SERVES MANKIND

MONSANTO CHEMICAL COMPANY, 1706 S. Second St., St. Louis, Missouri

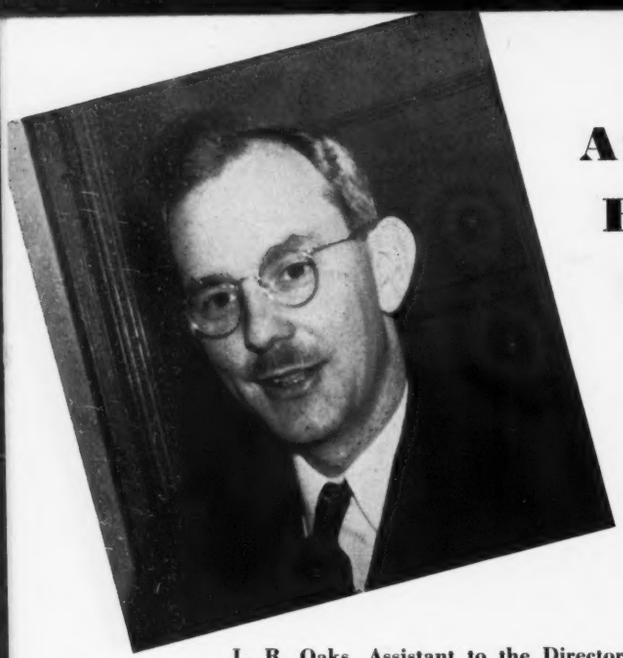
Please send me samples of ☐ Methyl Phosphoric Acid ☐ Ethyl Phosphoric Acid ☐ Normal Propyl Phosphoric Acid ☐ Normal Butyl Phosphoric Acid ☐ Amyl Phosphoric Acid.

*Name*_____

*Firm*_____

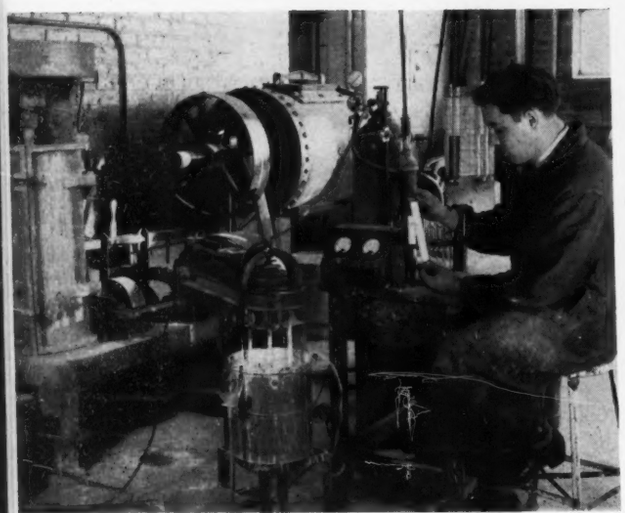
*Address*_____ *City*_____

Armour Research Foundation



L. R. Oaks, Assistant to the Director

A little more than six years ago (May, 1936) a small group visualized a somewhat unusual scientific research and experimental service to American industry. To achieve it, the Armour Research Foundation was incorporated as a not-for-profit institution and began its work in a few rooms of an old apartment house with a staff of three men and a budget of $30,000. This year the still-growing staff of 200 occupies four laboratory buildings and the annual budget is a million dollars. About 1300 corporations, government agencies and associations of manufacturers have availed themselves of this service to date.



Above, a pilot plant chemical process study.

Below, scene in bacteriological research laboratory.

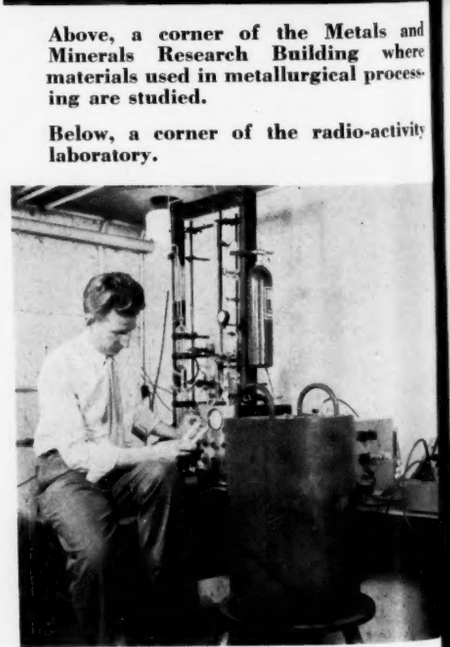
In the solution of industrial technical problems, development of new products and processes, and special studies the Foundation operates on a basic method known as the Armour Plan for Industrial Research. Each industrial problem is undertaken as a responsibility of the entire organization. One or more staff members assigned to the problem carry out the major part of the work, but progress is accelerated by calling in as many of the other staff specialists as may be able to contribute toward the solution. The staff includes men in virtually every field of science, and seldom has there been a problem whose solution involved less than three or four. The Armour Research Foundation does not use the "fellowship" system, but all of the research workers are full-time permanent staff members.

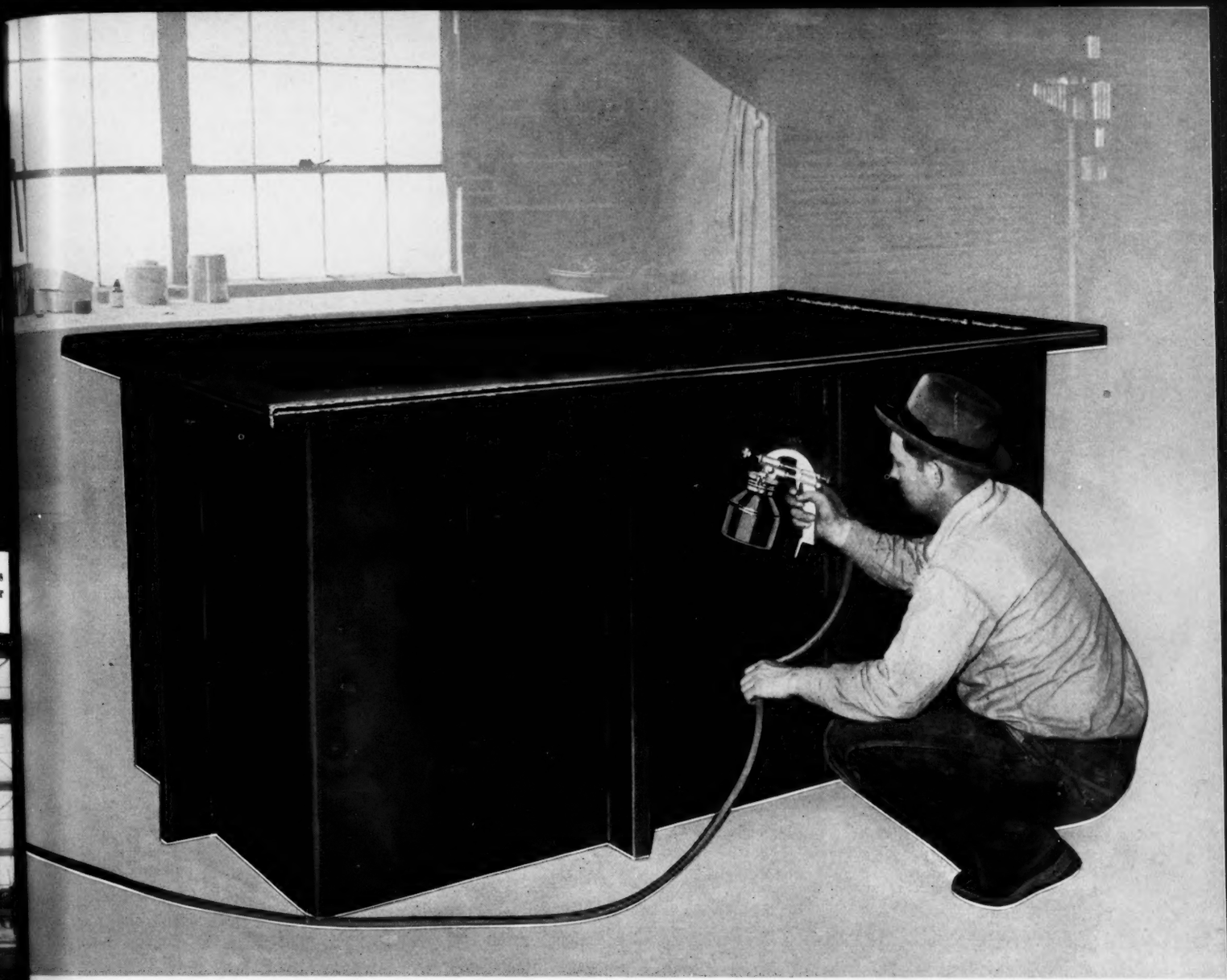
The Foundation does not undertake problems whose interests are in competitive conflicts. Agreements covering industrial research projects provide for patent rights, monthly and final reports, and the execution and treatment of findings in strict confidence. In addition, the Foundation carries on published fundamental research, and enjoys cooperative advantages through its affiliation with Illinois Institute of Technology. Among the more general services the Foundation operates the National Registry of Rare Chemicals, aiding without charge in the location of special materials for manufacturers and research laboratories.

Studies of the behaviour of substances at pressures of 1,500,000 pounds per square inch.

Above, a corner of the Metals and Minerals Research Building where materials used in metallurgical processing are studied.

Below, a corner of the radio-activity laboratory.





"TYGON PAINT RESISTS 90% OF THE KNOWN CORROSIVES"

Excerpt from a Research Report to U.S. Stoneware's Committee on Corrosion Control, January 3, 1943:

". . . replies to our survey among users of Tygon have proven extremely helpful in broadening our knowledge of Tygon's chemical resistance under difficult operating conditions. Incidentally, you will be interested to learn that the surveys indicate Tygon Paint withstands the attack of more than 90% of the known corrosives."

—D. F. Siddall, Director of Research.

Tygon Paint possesses the basic corrosion-resistant characteristics of the parent Tygon — the amazing synthetic, rubber-like material, used in the manufacture and handling of innumerable corrosive agents. Tygon Paint is pure Tygon, liquefied by the addition of solvents, which on evaporation leave a sturdy, durable film of chemically unchanged Tygon.

Tygon Paint is used to protect wood, metal or concrete from the attack of corrosive fumes, condensates, occasional spillage, or from exposure to moisture, oils, sunlight, air, or other oxidizing elements. Tygon Paint shows no tendency to crack, craze, check, or "weather," even after long exposure. Tygon is unaffected by water, fresh or salt (continuous exposure for more than 1000 hours in salt spray tests showed no effect). Tygon Paint possesses high dielectric strength, of importance where electrolysis is present.

Tygon Paint films are flexible. They neither become brittle at temperatures well below zero, nor soften at temperatures as high as 150 degrees F.

Tygon Paint may be applied by spray, brush, dipping or roller-coating to wood, concrete or metal surfaces. May be air-dried or baked. Formulations include black, white, clear, and a wide range of colors.

For detailed information on the use of Tygon Paint, and other Tygon corrosion-resistant materials: linings, rigid or flexible tubing, gasketing impregnating solutions, or molded Tygon products — write Engineering Department, The U.S. Stoneware Company, Akron, Ohio. In Canada: Chamberlain Engineering, Ltd., Montreal.

U. S. STONEWARE

AKRON, OHIO

ENGINEERS • MANUFACTURERS • ERECTORS OF CORROSION-RESISTANT EQUIPMENT

Institute of Gas Technology

Dr. Fred W. Sullivan, Jr., Technical Director.

Two of the staff of CHEMICAL INDUSTRIES recently visited the Institute of Gas Technology in Chicago and spent an interesting day with the staff in looking over the laboratories and work being done there. The Institute was established in 1941 by the gas industry to function as an educational and research institution. It is affiliated with Illinois Institute of Technology. Its four objectives are to train men, to serve as a center of fundamental and applied research in gas technology, to stimulate and correlate research in the industry and to collect and disseminate scientific information pertaining to gas technology.

The Institute is supported by producers and distributors of natural and manufactured gas, by manufacturers of gas-burning appliances and by sponsors outside of the industry who have research interests in the Gas Institute's field. Some of these sponsors are Government organizations, since gas and its by-products enter into many vital war problems.

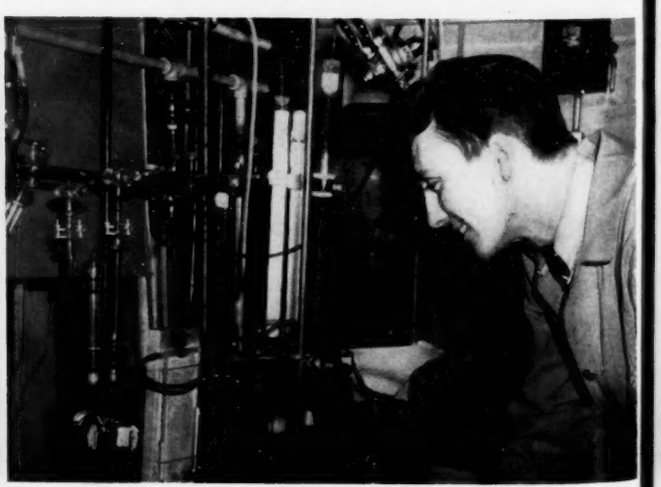
In addition to research projects backed by sponsors the Gas Institute initiates and conducts projects of its own in problems of particular concern to the gas industry. Much of this work is at present of direct military significance. In its educational program the Gas Institute is a graduate school, granting not more than fifteen fellowships in any one year. Each Fellow holds a degree in chemical engineering or a closely related field and is a candidate for an advanced degree. Under the contract of affiliation the degree is granted by Illinois Institute of Technology when the candidate is properly certified by the Gas Institute faculty.

Above, Dr. Lincoln R. Thiesmeyer, Educational Director.

Above, Dr. P. W. Garbo, Research Associate.

Below, Dr. C. H. Riese, Research Associate, with part of equipment used to produce a plasticizer.

Below, E. A. Knaggs, Technical Assistant, using apparatus for analyzing sulfur compounds in gas.



HAS LAUNCHED ST. REGIS MULTIWALL PAPER BAGS IN THE PETROLEUM INDUSTRY

Launching grease, that heavy, dark brown material composed of paraffin and other heavier residual waxes, greases the ways for our Victory Ships. It also promises to help in launching the St. Regis Multiwall Paper Bag as a container for many similar petroleum products.

For St. Regis packaging engineers recently developed a most successful Multiwall Paper Bag especially adapted for the handling of this product. This St. Regis Bag, lined with a special inner sheet, prevents the penetration of the hot grease ... poured at 143° F. Bags are filled through a 1½" hose connected directly to the holding tank. After filling, the tops are folded over twice and are stapled closed with a hand stapling machine. After the grease has cooled, the lining peels easily and completely from the hardened block.

Great interest has been evidenced as to the suitability of St. Regis Multiwalls for the packaging of other types of greases, waxes and petroleum products.

If you have a difficult packaging problem, a custom-built St. Regis Bag may solve it.

St. Regis Multiwall Bags are made with multiple independent walls of sturdy kraft paper. They are astoundingly strong, moisture-resistant, and completely impervious to dust, dirt, or insects.

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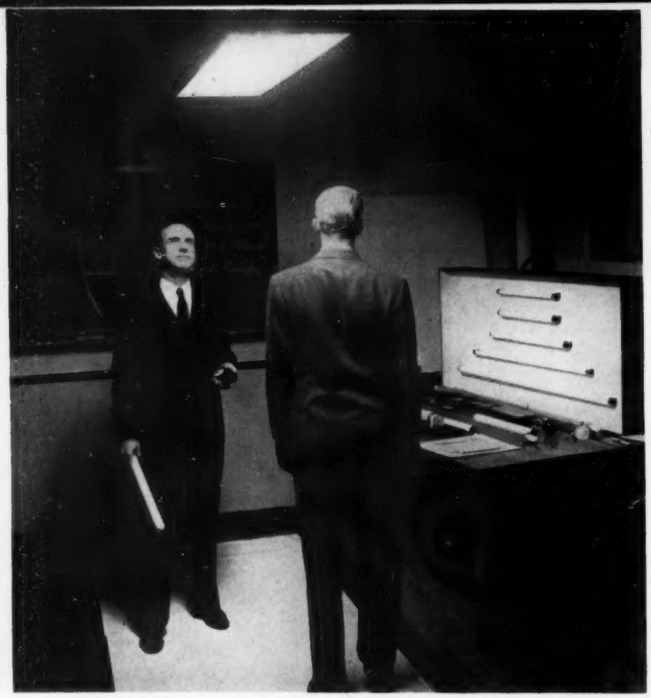
Phosphors

Phosphorescent or luminescent materials are not new but within the past three or four years there has been a greatly increased interest in them because of their adaptability to blackout lighting.

On this page we present a group of interesting photos on the subject from the Westinghouse Lamp Division.



Left, Light intensity of fluorescent lamps is measured by E. W. Beggs, Westinghouse lighting engineer, to determine their effectiveness in "charging up" a floor covering of phosphorescent material. When exposed to the rays from the lamps, the phosphorescent coating stores up the light and then glows softly for several hours in complete darkness.

Below, Phosphorescent chemicals etch a path of soft green light across the floor enabling engineers at the Westinghouse Laboratories to walk about with complete safety in a darkened laboratory.

Below, That one can leave his shadow behind him is proved by S. G. Hibben, Director of Applied Lighting, Westinghouse, Bloomfield, N. J. Done as a stunt, nevertheless it shows the possibilities of the new phosphorescent materials. Mr. Hibben stood for a few seconds between a fluorescent lamp and a phosphorescent painted background so that all but the area of his shadow became light "charged." He then turned around and moved to one side while this picture was made as a time exposure in complete darkness.

Below, A young lady and her escort can stroll safely during a blackout if they wear fluorescent accessories to make themselves visible to motorists and other pedestrians.

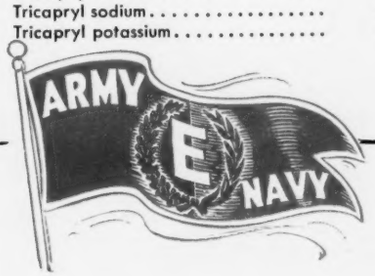
Below, Important blackout bulletins can be made as visible as a softly glowing neon sign although no discernible light is nearby. The paper is treated with special fluorescent chemicals and irradiated with invisible ultraviolet which will cause the bulletin to literally light up in the dark. Here, both the feather in the woman's hat, the flower on her dress and the man's hat and arm band are glowing under ultraviolet to avoid blackout collisions.

ALKYL PHOSPHORIC ACID SALTS

A Challenge to Chemical Research for Post-War Application

PROPERTIES OF ALKYL PHOSPHORIC ACID SALTS

COMPOUND	% Concentration	Sp. Gr. at x°/4° C.	Ref. Index n_D
Orthophosphates, R_2MPO_4			
Diethyl sodium	78	1.258 (25)	1.409
Ethyl octyl sodium	82	1.119 (30)	1.431
Ethyl octyl potassium	77	1.147 (25)	1.425
Ethyl octyl ammonium	84	1.044 (25)	1.434
Ethyl capryl sodium	84	1.069 (75)	1.428
Dibutyl ammonium	88	1.032 (25)	1.425
Orthophosphates, RM_2PO_4			
Monomethyl ammonium	54	1.246 (30)	1.409
Monomethyl sodium	66	1.53 (30) app.	—
Monomethyl calcium	100	2.50 (30)	1.532
Monoethyl ammonium	55	1.240 (30)	1.415
Monoethyl sodium	66	1.472 (30)	1.423
Monoethyl calcium	100	1.917 (30)	1.532
Mono i-propyl ammonium	62	1.196 (30)	1.415
Mono i-propyl sodium	60	1.320 (30) app.	1.420
Mono i-propyl calcium	100	1.928 (25)	1.480
Mono n-propyl calcium	100	1.774 (25)	1.50
Mono n-butyl ammonium	60	1.17 (25)	1.426
Mono n-butyl sodium	71	0.889 (25) app.	1.426
Mono n-butyl calcium	100	—	1.478
Mono i-amyl ammonium	77	1.14 (25) app.	1.432
Mono i-amyl sodium	73	1.24 (30) app.	—
Mono i-amyl potassium	66	1.30 (30)	1.425
Mono i-amyl triethanolamine	100	1.213 (25)	1.491
Pyrophosphates, $R_2M_2P_2O_7$			
Dimethyl sodium	65	1.4 (30) app.	—
Diethyl ammonium	70	1.305 (25)	1.434
Dibutyl ammonium	64	1.183 (25)	1.422
Di i-amyl ammonium	72	1.143 (25)	1.430
Di i-amyl sodium	74	1.2 (25) app.	—
Di i-amyl potassium	60	1.262 (25)	1.412
Dicapryl triethanolamine	100	1.170 (25)	1.483
Tripolyphosphates, $R_5M_5P_6O_{20}$			
Pentaethyl ammonium	72	1.317 (25)	1.434
Pentaethyl potassium	55	1.390 (30)	1.402
Penta i-amyl ammonium	77	1.187 (25)	1.436
Penta i-amyl sodium	71	1.17 (25) app.	—
Penta i-amyl potassium	68	1.323 (25)	1.420
Penta octyl sodium	70	1.17 (25) app.	1.435
Penta octyl potassium	71	1.208 (25) app.	1.434
Penta capryl sodium	70	1.19 (25)	1.437
Penta capryl potassium	77	1.175 (25) app.	1.435
Tetrapolyphosphates, $R_6M_6P_4O_{13}$			
Triethyl ammonium	70	1.345 (30)	1.437
Triethyl potassium	61	1.486 (30)	1.415
Tri i-amyl ammonium	63	1.228 (30)	1.439
Trioctyl sodium	63	1.19 (25) app.	1.433
Trioctyl potassium	70	1.20 (30) app.	1.432
Tricapryl sodium	62	1.26 (25)	1.430
Tricapryl potassium	58	1.262 (30)	1.414



No other group of chemicals offers greater opportunities for chemical research than the organic phosphorus compounds. Many interesting applications have already been discovered . . . many perplexing problems of industry have been solved . . . yet the challenge to further research is as inviting as ever. Typical of those uses already uncovered are the following:

Wetting agents—Certain of the soluble sodium salts are strong wetting agents. They are substantially neutral when dissolved in distilled water. Evidence of their high surface active nature is indicated by the remarkable low values for surface tension obtained in the following tests.

% Concentration (70% Paste)	Penta octyl sodium tripolyphosphate (dynes/cm. corr.)	Penta capryl sodium tripolyphosphate (dynes/cm. corr.)
Distilled H_2O	71.6	71.6
0.0045	35.9	32.0
1.36	25.8	23.0
2.85	24.5	22.8

Flameproofing compounds – Several of the ammonium salts are excellent flameproofing compounds which do not affect the feel of textiles and paper. When used in combination with ammonium phosphates they impart a softening effect and markedly modify the crystallizing characteristics of the inorganic salts.

Properties of the Alkyl Phosphoric Acid Salts . . . summarized in the adjoining table . . . have been carefully investigated by Victor research chemists. A few of the compounds are in commercial production for war purposes. Because of present limitations in the supply of certain critical materials, it is not possible to submit samples of all products listed. Where available, however, they will be gladly sent upon request.

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BOOKLETS & CATALOGS

Chemicals

A461. *Alkali Products.* New 30-page Solvay Products booklet gives specific information on the forms, and the chemical and physical properties of Solvay products and their uses. There are also short sections on safety methods, on dissolving caustic soda and caustic potash, and utilizing their Technical Service. Well organized for ready reference, the bulletin will be found useful by buyers and production men. Solvay Sales Corporation.

A462. *Aluminum.* The workability of aluminum is briefly reviewed and illustrated in the *Aluminum News-Letter.* It can be die-cast and sand cast; it can be rolled, extruded, hammered, stamped, drawn, forged, machined, welded, riveted, brazed, and stranded. Aluminum Company of America.

A463. *Aluminum.* 8-page *Aluminum Service Bulletin* No. 4 lists selected references on the metal under the headings: aircraft, alloys, alumina and other non-aluminum products, aluminum industry, castings, chemical equipment, electrical conductors, forming, inspection methods, machining, protective finishes, protection and maintenance, riveting, structural applications, structural design, structural tests, thermal treatments, transportation, welding and brazing, and miscellaneous. Aluminum Company of America.

A464. *Filterpapers.* 4-page booklet contains information on "ash-low", .03 to .04%, and "ash-free", .005 to .007%, filterpapers of domestic manufacture. Compares foreign and American papers for percentage of ash by weight, rate of flow using Bureau of Standards methods, and retention of $BaSO_4$. Includes handy information guide to laboratory filterpapers. Carl Schleicher & Schuell Co.

A465. *Fusion Alloys for Production Silver Brazing & Soldering* are described in the first portion of new engineering handbook. These include low and high temperature solder alloys, silver brazing, brazing and welding fluxes, low temperature "micro-film", fusion "seel-cote", and "LoFlo" silver braze alloys, applied by brush, automatic line, automatic point, automatic area, spray, and dip methods. Additional engineering data will be published in loose leaf form. Fusion Engineering.

A466. *Gas Analysis Apparatus.* New catalytic unit for determining combustible components includes a copper oxide tube and a catalyst tube. The former augments the catalyst tube, permitting complete separation by determining hydrogen and usually carbon monoxide by oxidation over copper oxide, methane and ethane by catalytic combustion. Burrell Technical Supply Co.

A467. *Karaya Gum.* A product of British India which is shipped from Bombay, Gum Karaya is collected from trees, cleaned and sorted by natives and then re-classified upon arrival in the United States. Because it swells in water, forming a more or less opaque jelly, the gum is commercially valuable, but it is this viscosity, or water-absorbing quality which is its most variable factor. The analysis and price fluctuation of Karaya are also discussed in the interesting, illustrated folder. Innis, Speiden, & Co.

A468. *Leather.* Booklet describes the leather and glue manufacture of the United States Leather Company. Includes annual report to stockholders. The U. S. Leather Co.

A469. *Paint Finish.* Varied applications of one-coat finish, from gas heaters to precision instruments, and the infrared baking of the finish to insure rapid drying are described in the illustrated Vol. 4, No. 6 of *New Wrinkles in Finishing.* New Wrinkle, Inc.

A470. *pH.* This handy little booklet gives a quick, not-too-technical picture of what pH is, the pH scale, how pH is measured, and pH control. Includes summaries of industrial applications and descriptions of glass electrode pH equipment, "What Every Executive Should Know about pH." National Technical Laboratories.

A471. *"The Pioneer"*, briefly mentions an air raid siren timer, a floor-covering liquid said to give a finish resembling linoleum, a temperature controller for textile dryers, a flame-proofing material for protection against incendiary bombs, and a slitter-winder for waxed or coated papers and varnished cambrics. Niagara Alkali Company.

A472. *Plastics.* The injection molding of thermosetting materials in continuous production is discussed and its advantages outlined in the current issue of *Durez Plastics News.* Durez Plastics & Chemicals, Inc.

A473. *Rubber.* 1942 edition of "Typical Examples of B. F. Goodrich Development in Rubber" has been released. Consists of reproductions of 26 advertisements that explain in interesting, eye-catching photographs and text the varied applications of elastomers. The B. F. Goodrich Company.

A474. *Sanitary Chemicals.* Questions and answers on current marketing problems are compiled in the handy little booklet, distributor's and salesman's guide to war-time operations. Fuld Brothers.

A475. *"Specific Organic Reagents of Analytical Chemistry"*, by Edmond S. Perry briefly reviews the reactions of organic reagents with metallic ions to form complex salts. "The ideal reagent is approached by those compounds that have a definite specificity for one metallic ion under a given experimental environment." The advantages of these reagents in analytical practice are outlined by Mr. Perry in his short and excellent summary. Vol. 14, No. 5, *Synthetic Organic Chemicals.* Eastman Kodak Co.

A476. *Water Treatment. The Betz Indicator*, current issue, continues its series of articles on "Unit Processes

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The Chemical Business Magazine

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NEW YORK, N. Y.

of Water Treatment." No. 11 discusses anion exchange, the removal of anions such as sulfates, chlorides, nitrates, etc. from water. Chemistry involved, mechanics and equipment, applications, and limitations are outlined. W. H. & L. D. Betz.

A477. *"Zinc in War"* tells the story of the men and equipment behind the war-time production of zinc metal and zinc pigment. Profusely illustrated folder. The New Jersey Zinc Company.

Equipment — Containers

E821. *Automatic Control and Recording Instruments* for industrial furnaces, dryers, kilns, and ovens are described in a series of bulletins recently published. Covering pyrometer, thermometer and humidity recorders and controllers, draft controllers, control valves and accessories, the set is bound together in loose leaf form to permit easy insertion of additions and revisions. Illustrated with photographs, application drawings, and wiring diagrams. The Bristol Co.

E822. *Blowers, Exhausters,* gas boosters, and industrial vacuum systems for plants are concisely described in Bulletin I-100. Illustrated with photographs of the equipment. Allen Billmyre Corporation.

E823. *Centrifugal Pumps.* New maintenance handbook makes specific recommendations for pump care which applies to all makes of pumps. Step by step a centrifugal pump is built, and as each part is added, the way it's built and functions are seen to determine the way it should be cared for. Wartime tips included in the manual describe: How a change in liquid can blitz a pump, easy ways to find leaks, common mistakes in packing stuffing boxes, how tight is "too tight" for a gland, how to figure head, how to protect pumps against cavitation, the role of water as a lubricant in pumps, diagnosis of pumps ills. Allis-Chalmers.

E824. *Compressors and Pumps.* Production of synthetic rubber requires large scale compression of gases and movement of fluids in its basic processes of manufacture. 8-page booklet describes and illustrates steam-driven "Angle" compressors, offered in 3, 4, 5, 6, and 8-cylinder models, ranging from 500 to 4,000 H. P., and pumps, and the part they play in butadiene production. Clark Bros. Co., Inc. & Pacific Pump Works.

E825. *"Corrugated Boxes, Selling With"* is the title of No. 4 in the Little Packaging Library. Contains suggestions and ideas of package improvements which affect sales. The Hinde & Dauch Paper Company.

E826. *Electric Control.* New 29-page catalog describes control equipment capable of handling processes which can be controlled by positioning a valve or other regulating device. Diagrams and text explain in detail the adjusting of equipment to fit the needs of a particular process. Photographs show the instruments in use in a variety of applications. Catalog N-OOA. Leeds & Northrup Company.

E827. *Factory Trucks, Trailers, and Casters.* Trucks and trailers, both all steel and wood platforms; end, side, and three-way entrance dump hoppers; and heavy duty all steel castors are described in the first 18 pages of a new Industrial Handling Equipment catalog. Contains specifications, diagrams and illustrations of the equipment and is of the semi-loose leaf type for permanent binding. Rose Manufacturing Company.

E828. *Plastics and Rubber.* Latest issue of *Farrel-Birmingham Equipment News* describes the process-testing pilot plant which the company makes available to manufacturers of rubber and plastics for the development of new materials, new processes, new products, and the improvement of existing ones. Machinery for processing various types of plastics, including Banbury Mixers, mills, Gordon Plasticators, calenders, and molding presses are also described and illustrated. Farrel-Birmingham Company, Inc.

E829. *"Producing for Victory"* is the title of an attractive booklet designed to show how war production has to a large extent displaced peacetime manufacturing for these producers of dairy equipment. Girton Manufacturing Co.

E830. *Rubber Goods, Molded.* In question and answer form, this 8-page Catalog Section 7020 is designed to supply practical information in the use, application and development of rubber parts molded to fit specific industrial requirements. Starting with a description of the process used in molding most rubber products, the publication has questions and answers on molds, mold cavities, discussion of mold costs, materials of which molds are made, tolerance limits in manufacturing molded rubber goods, attachment of rubber to other metals in molding, and the varied shape of molded articles. The B. F. Goodrich Company.

E831. *Thermometers, Recording and Indicating Controls,* ranges between -70 and 1000°F., are covered in four bulletins which discuss the "electronic principle" of effecting control without mechanical contact between measuring and control sections of the instruments. Also described are program and proportioning thermometers, available in both recording and indicating types, and combinations of thermometers with Flame-otrol, combustion safeguard instrument. Includes photographs and operating diagrams. Bulletins G503-2, G603-2, G303-2, G403-2, Wheelco Instruments Company.

E832. *Valves.* Globe and check valves are described and pictured in this attractive 36-page reference booklet, printed in two colors. To make the bulletin more readily useful, it is divided into six sections, each of which can be located by an identifying tab. The headings include Bronze Globe, Forged Steel Globe, Balanced Stop, Bronze Check, Forged Steel Check, and Cast Steel Check Valves.

The pressure ratings for the unit are shown along with its dimensions and prices in uniformly-arranged tables. In every case a sectional view is provided in addition to the outside picture, indicating the flow. Specifications and engineering information round out a complete presentation. Bulletin A-4. The Watson-Stillman Company.

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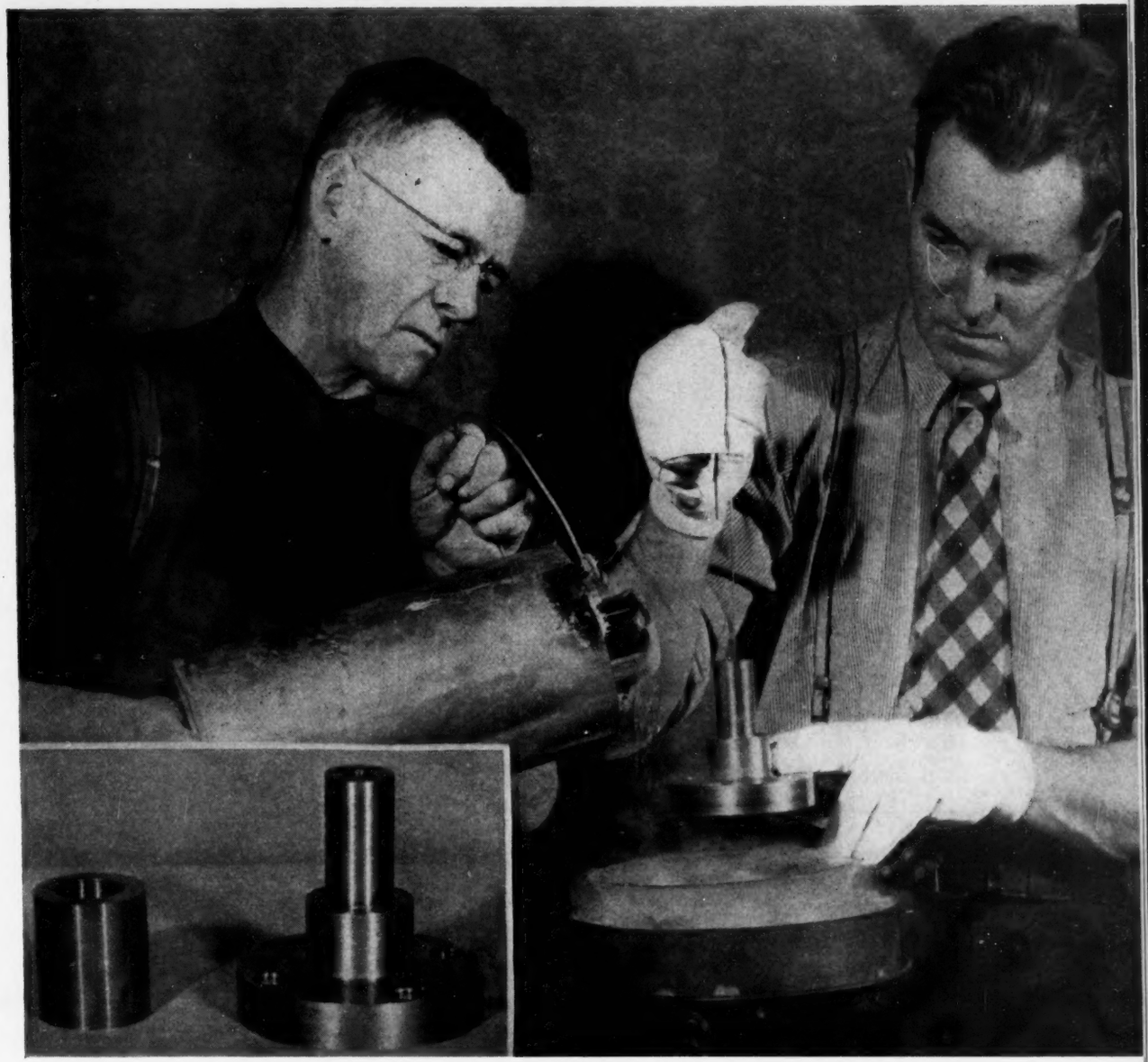


NEW CHEMICALS FOR INDUSTRY

FITS LIKE A GLOVE!—Liquid nitrogen, 410°F. below zero, is used by General Electric to shrink steel parts used in manufacturing wartime electric apparatus. The shrinkage allows a diameter clearance of slightly less than two-thousandths of an inch between the steel part shown (right) in the inset photo and the hollow tungsten carbide cylinder which is later fitted over it to form a complete punch. The shrunken part quickly expands, forming a strong bond, and the assembled punch is ready for war production.

Digest of Chemical Developments in Converting and Processing Fields

Coal storage

COAL

An Abundant Raw Material for New Chemicals

Few materials are used in as large quantities in chemical reactions as coal. It serves a dual purpose, for not only is it used as a raw material in various chemical and metallurgical processes but as a source of power and heat needed in manufacturing. Fortunately, we have a tremendous reserve of this vital material. In this article a well-qualified group discusses the relation of coal to a growing organic chemical industry.

By The Coal Research Laboratory Staff of Carnegie Institute of Technology

THERE is no coal shortage. In the face of rationing of rubber, gas, oil, sugar, and coffee this is significant. Coal is our basic source of energy and our most abundant source of carbon. Organic chemistry—the chemistry of carbon—has contributed immeasurably to our industrial civilization and forecasts of its future promise to dwarf past accomplishments into insignificance. We must expect to see the two, coal and organic chemicals, march side by side, hand in hand into the future. Coal has already assumed some share of importance in the chemical industries, but its strategic role is not generally recognized.

Coal in Our War Effort

Coal is helping to win the war by its part in the production of aviation fuels, synthetic rubber, and plastics, all of strategic importance, and by originating pharmaceuticals that have reduced the loss of life and limb in our armed forces.

Aviation fuel

Did you ever hear of cumene? "It is the name of a new and vital war product—a blending fluid that punches holes in the 100 octane ceiling of aviation gasoline and carries its quality on up."[1] It is produced from the alkylation of coke-oven benzol with propylene in existing refinery equipment.[2] This coal-derived fuel now provides our flyers with that added superiority of engine performance, so essential to their splendid combat record.

Synthetic rubber

Equally important to our war effort is our rubber supply. A medium-sized tank uses 500 pounds, a large bomber 1500 pounds and a battleship up to 75 tons. It is significant that Neoprene, the first synthetic rubber in this country, is made from coal and limestone via carbide and acetylene, using chemically a little over one pound of bituminous coal per pound of neoprene.[3] This material is highly resistant to petroleum products and is excellent for heavy duty tires. The Government program calls for an annual capacity of 69,000 tons by the end of 1944.

Koroseal is another coal-derived product highly prized by our Navy. Now used up to 22,000 tons per year as a rubber substitute, it is extremely resistant to corrosive chemicals, and is highly fire-resistant, making a desirable electrical insulation for marine use.

Buna-S is our main hope to keep our rubber-tired economy from collapse. The Government revised program calls for 845,00 tons of annual production compared to a total of 1,106,000 tons of all synthetic rubber. It is now generally known to be made by copolymerization of approximately three parts butadiene and one part styrene. Butadiene can be produced in a hundred odd ways, from coal, petroleum, and agricultural products, but it will be made chiefly from petroleum and grain products during the emergency. It can be made from benzol, but the record production of benzol is now needed for styrene, phenol, and cumene. Styrene is being produced chiefly if not solely from coke-oven benzol. Thus the success of our entire synthetic rubber program, and in turn, our whole war effort, hinges on the uninterrupted production and flow of coal to the coke ovens of the nation.

Modifiers and plasticizers are required in the processing of all types of rubber. It has been common practice to plasticize natural rubber with palm or cottonseed oil, but these are unsuitable for synthetic rubbers. The search for suitable materials narrows down to the aromatic structure of which the predominant source is coal tar and other coal products. The best modifier is a coal tar fraction, and one of the best plasticizers is butyl phthalate from naphthalene, a coke oven by-product. Since plasticizers may comprise as much as 10 to 25 per cent of the weight of synthetic rubber, an important tonnage is involved.

Plastics

It is difficult to distinguish between some of the synthetic rubbers and some plastics, because their properties qualify them for both classifications. Plastics originated in 1855 with the discovery of celluloid in England by Parkes. They have been popularized by their use as molded parts of automobiles, railway cars, and in architectural decoration. Among uses in the war effort are the developments of Plexiglas and resin-bonded plywood for use in aircraft. We are here

chiefly interested, however, in raw material sources.

Phenol

Phenol is one of the most important raw materials for plastics. Some 70,000,000 pounds are being produced annually. Of this amount 20-25 per cent is recovered from coal tar, and the remainder is synthesized from benzol. U. S. Tariff Commission figures for 1940 show that 93,000,000 pounds of synthetic resins were made from the tar acids, principally phenols and cresols.

Naphthalene

Another source material is naphthalene, one of the major coal-tar products, consumption of which was 166,000,000 pounds[4] in 1940. Half this amount went into phthalic anhydride, which is used principally in the manufacture of alkyd resins and phthalate plasticizers. The Tariff Commission reports production of 98,000,000 pounds of alkyd resins in 1940, and a total production of synthetic resins from coal tar of 223,000,000 pounds.

Nylon

Silk hose from coal, air and water have captured the imagination. Nylon is officially defined as a "man-made protein-like product (polyamide) which may be formed into fibres, bristles, sheets and other forms which are characterized when drawn, by extreme toughness, elasticity, and strength. The particular type of Nylon that at present appears most suitable for making textile yarn is made from a diamine and a dibasic acid, both of which are derived from phenol."[5] Nylon has a chemical structure close to that of natural silk, is superior to it in most physical properties, and can be used wherever silk was formerly used. It has completely replaced silk for military use and will possibly permanently replace it for civilian use after the war. Another coal-derived product has gone into action.

Glyptal

The glyptal resins are made from phthalic anhydride and glycerine. They are used as a finish for metal products, as sealing and electrical insulating compounds. They are tough, adhesive and easily applied.

Vinyl Compounds

The Vinyl group is derived from coke and limestone via carbide and acetylene. The material can be molded, or drawn to fibers as Vinyon yarn. Vinyl chloride particularly is corrosion resistant, and like Koroseal can be woven into corrosion resistant fabrics. Lucite and Plexiglas belong in this family.

Water Gas Products

The use of the water gas reaction to produce simple chemical intermediates has resulted in the synthesis of several important materials. Coke from carbonization of coal is reacted with steam to produce carbon monoxide and hydrogen. These are recombined by catalysis in a variety of ways to obtain the desired end product.

Ammonia

Ammonia is produced by use of hydrogen and the nitrogen-bearing blow gas. The carbon monoxide is converted to carbon dioxide and washed out of the gas, leaving nitrogen and hydrogen which are combined in a catalytic process. Ammonia is important in production of fertilizer, nitric acid, and urea. The latter is made by combining ammonia with the previously removed carbon dioxide. It is used to produce a variety of plastics.

Methanol

Methanol, or methyl alcohol, is also synthesized from water gas. Its uses as anti-freeze and solvent are well known. It may be oxidized to formaldehyde for use in the phenol-formaldehyde resins such as Bakelite; and for use in the urea-formaldehyde resins such as Beetle ware. Although figures are unavailable it is probable that several million tons of coal are annually used in these water-gas processes.

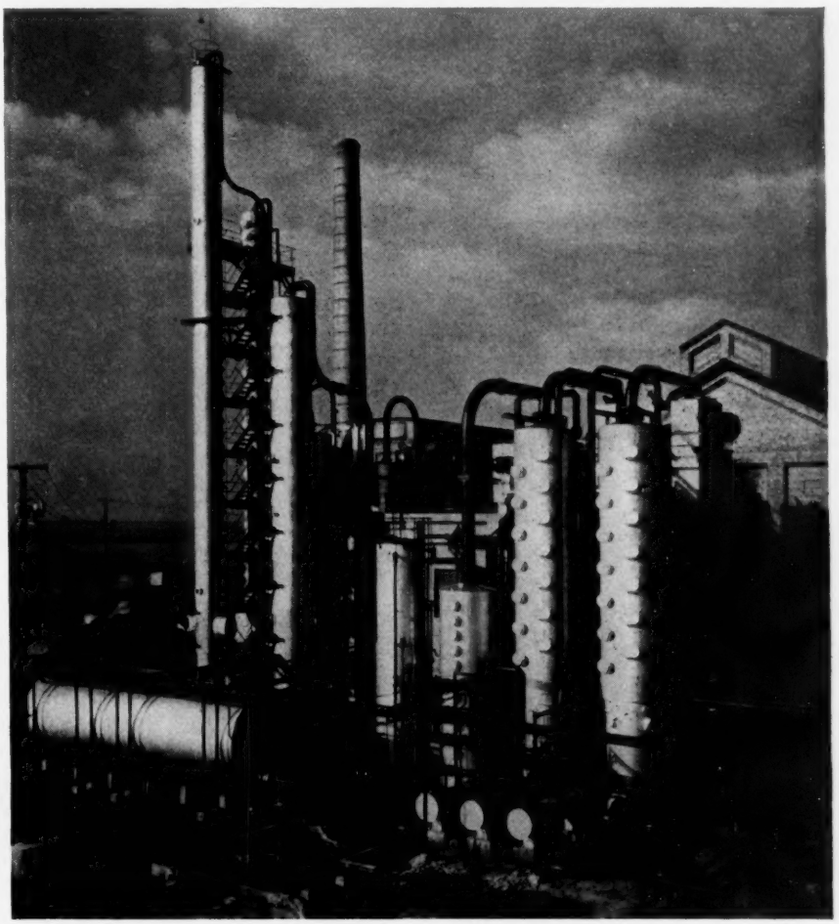
Other Uses

Activated carbon is now made from bituminous coal. During World War I, housewives saved peach and prune pits from which activated carbon for gas masks was made. This is no longer necessary as the coal-derived product is satisfactory. The details of the process have not been revealed.

An improved base exchange material is now made from coal for softening water.[6] Boiler plants have customarily used Zeolite minerals for this purpose. Carbonaceous zeolites have successfully passed the development stage and are now commercially available. The new material has a high exchange capacity, from 9500 to 12,800 grains calcium or magnesium per cubic foot; is rugged; contains no silica. The latter property is much desired in boiler-water conditioning.

Other coke oven products have come into wide use. Tar for road building amounts to some 200,000,000 gallons per year. Creosote for wood preserving is consumed in about the same amount. Insecticides and germicides from coal tar are well known. Over 150 medicinals and

Light oil recovery plant



synthetic vitamins are now being made, and the miraculous sulfa-drugs are popularly known to be derivatives of coal tar.

In brief, coal, by providing the materials for aviation fuel, synthetic rubber, plastics used widely in ordnance, coatings and preservatives for structural materials, and infection-preventing drugs, has gone to war. We need only mention the strategic importance of coal as fuel in war industries and homes.

Future Possibilities

The war is crowding years of technological progress into months and weeks. It is therefore sheer speculation to prophesy the position of coal in the post-war period. On the basis of current developments and research, however, consumption of coal in the chemical industries will surely be multiplied.

The majority of products reviewed above depend on the coke-oven. Their production depends on the demand for coke, 70 per cent of which goes into the blast furnace, and which in turn depends on the demand for steel. Unmarketable by-products, pygmies of the past may become giants of the future, creating an unbalanced demand between by-products and coke. Either surplus coke may be produced or other sources of by-products may be developed. A surplus of coke would be absorbed if the price were competitive. Increasing activities toward smoke-abatement in cities will create new demands for domestic heating. Carbide and water gas processes would be accelerated.

Fischer Tropsch

A cheap coke supply might favor the use of the Fischer-Tropsch synthesis, which now furnishes Germany and Japan a large portion of their motor fuels, lubricating oils and fats. Reports indicate Germany is producing a million tons per year of such motor fuel. Water gas is combined over a catalyst to produce a low octane gasoline which can be reformed for aviation use, a good Diesel fuel, and paraffins which can be worked up for lubricating oil, or oxidized to fatty acids. This process has also been mentioned as one for producing gasoline from natural gas.

On the other hand, processes of the future may circumvent the necessity of an economic balance of several products, and convert coal in its entirety to the desired form of intermediate materials. Research is in progress on several such processes.

Hydrogenation

Hydrogenation, or liquefaction of coal, is a commercial process in Europe. The U. S. Bureau of Mines[7] is conducting research on this subject and has shown that motor fuel can be produced from American coals, when necessary or economical. The process has more immediate promise, however, in production of aromatic chemicals such as benzol, phenol, toluol, and naphthalene. Experiments showed yields of 10 to 15 times as much phenol as may be derived from carbonization, and further research may raise this ratio.

Complete gasification

Complete gasification of coal by direct means has long been the goal of research, and work sponsored by the Bituminous Coal Research Incorporated is under way in this country designed to produce gas with no by-products.[8] Success of this project will provide low-cost gas to many areas not now served, and to others in the future should supplies of natural gas become depleted.

Solvent Extraction

Liquefaction of coal by means of solvents has shown[9] that for certain coals, over 70 per cent by weight can be extracted and, by evaporation of the solvent, produce a material containing 0.0 to 0.5 per cent ash. Such a treatment known as the Potte-Broche process has been reported to be used in Europe to make low-ash carbon for use as electrodes in aluminum production, and as a pulverized fuel for Diesel engines. This process might be applied to advantage in this country at once. Recent reports[10] indicate that certain oil refineries have been ordered to stop production of much needed heavy fuel oil in order to increase their production of petroleum coke for use as aluminum electrodes.

Oxidation

Coal can be partially oxidized to produce a series of aromatic acids, such as phthalic and mellitic, with substantial amounts of oxalic acid as a by-product. Research chemists at the Coal Research Laboratory of Carnegie Institute of Technology have produced these in the laboratory and are now developing commercial methods of manufacture. These materials can be used in plastics and synthetic rubber, and other uses are being sought.

The commercial development of these processes during and after the war is a definite possibility. The demand for benzol has multiplied very recently, and new sources to augment the present supply are necessary. Phenol and naphthalene will be required in greater quantity in proportion to the development of plastics. The wartime production capacity of ammonia, when released for civilian use will produce fertilizer in such abundance as to revolutionize agricultural trends. Nylon, Vinyl compounds and Koroseal promise to refashion our clothing habits and to change the whole course of textiles and fabrics. Coal in suitable quality and quantity is available to meet all these potential demands. It is our most abundant raw material.

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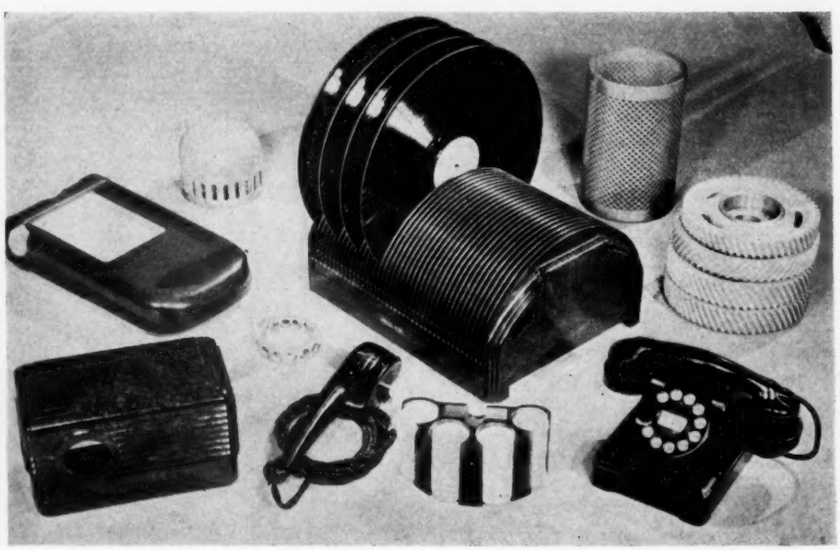
Plastics from tar acids



CHEMICAL SPECIALTIES

Con-Sol the special deodorant of the Consolidated Laboratories of St. Louis, Mo., now comes in handy jug-handled Duraglas bottles manufactured by the Owens-Illinois Glass Company. The new glass container has a screw top closure which protects the unused portion of the liquid for future applications. The jug has a bright three color, yellow, red and black label containing complete directions for the application of Con-Sol.

Industrial Agricultural Household

Containers in War Time

By Donald Knapp

Container Section, Chemicals Division, War Production Board

Chemicals are first line war materials and therefore it is very important that there be no interruptions in the flow to their destinations. The packaging of products in the chemical industry probably involves more different types of packages and materials than any other industry. The problem is doubly difficult because chemicals may be explosive, flammable, poisonous, corrosive, or all four. Our author here tells of some of the problems we're up against and some of the accomplishments already made.

THE packaging of products of the Chemical Division probably involves more different types of packages than any other division in the War Production Board. We will start in with ampoeles working up through bottles and glass carboys to glass-lined steel tank trucks. We use paper bags and boxes, cans and fiber drums, and wood boxes with or without wire binding. We use blackplate, tinplate, and terneplate cans; steel drums of all sorts and sizes; low-pressure gas cylinders and high-pressure gas cylinders; and tank cars, both regular and special types. In the Chemical Division we cover protective coatings for ships, buildings, bridges, and even cosmetics that form the protective coatings for our lady friends.

It would be practically impossible for any one man, or any one group of men, to be expert in all of the packaging problems faced by the chemical industry. We are very fortunate in having in the industry men with foresight and vision who have seen the trend of the shortages developing so that they are able to solve some of the problems almost as soon as they arise. There are, of course, some people who are interested only in the *production* of commodities and they fail to think out how they are going to *deliver* their products to their ultimate destination.

I presume most of you know that Order L-197 is the one that prohibits the packaging of certain products in steel drums. Originally we were asked to write a positive Order, but you can imagine the magnitude of such a positive Order when you stop to consider the thousands of chemical compounds and mixtures that are classified as "Chemicals."

At this time I would like to clear up one point that seems to be very confusing to a great many people. Order L-197 does *not* prohibit the sale of drums in any way. It *does* require that any drum that is sold be marked with an "X," and it *does* forbid the packing of certain commodities in steel drums. The reason for this is that these commodities can be packaged successfully in non-steel containers. The responsibility is upon the packager of the drum—not the seller of the drum or the users of the product. There is nothing in the Order to prevent a customer from returning a drum to his supplier. If the supplier cannot use the drum again for packing the original product, he may use it for a permitted product. If the supplier does not make any permitted product, it may be desirable to have the emptier of the drum sell his drums to a reconditioner. There is nothing in L-197 that prevents a reconditioner or secondhand dealer from buying or selling steel drums. He should know to whom he sold his drums, but what the buyer puts into the drums is not his worry. He should advise his customers of Order L-197 as a service to the buyer. The seller must mark the drums with an "X." The purpose of the X is to police the Order. No product on the (C) (4) list may be packed in X-marked drums except for the account of the Army, Navy, Maritime Commission, War Shipping Administration, and the Panama Canal unless specifically authorized by the Director General for Operations.

Section (C) (4) lists products and materials that may be packed in steel drums until the present supply of steel drums is exhausted and then must be packaged in substitutes for steel. The reason behind this is that a linseed oil drum or a liquid asphalt drum does not lend itself to reconditioning for such products as alcohol or carbon tetrachloride, so it seemed advisable to allow the users of these drums permission to continue to use drums until they are worn out, and to use substitute packages—principally tight wood cooperage—to replace their diminishing supply.

One outstanding example of what can be done in the chemical industry is shown by a report of a division of one of our largest manufacturers indicating that

77 percent of the containers purchased a year ago this month were metal packages. Today their purchases are only 13 percent metal. This has been made possible by re-using to the maximum extent so-called "one-time shippers" and by using fiber drums, slack barrels, and tight wood cooperage.

Another example is the case of a manufacturer of a liquid insecticide who needed tin-lined steel drums. The insecticide was important to the health and comfort of the civilian population, but steel and tin are both very important to the military. What was the answer? Glass carboys. The cost is higher and the package is not as convenient, but it does deliver the product in a usable form.

It has been established by competent chemical companies that Bessemer steel sheets are suitable for making such containers as caustic soda drums and other light-gauge drums. More care must be taken in using Bessemer steel than would be necessary in using Open Hearth steel. Production may be slowed down very slightly, but we have found out that Bessemer steel has been improved; and the Bessemer steel of today is a superior product to that of a year ago. Every chemical manufacturer who fabricates his own drums or who purchases sheet iron drums should look into the possibility of using Bessemer steel to relieve the situation and tightness on Open Hearth steel. The chemical industry would use less than two months' supply of Bessemer steel now available if all of our containers could be fabricated from this material; and we could release for important war uses the Open Hearth steel which we are now consuming.

Steel Is Short

There have been a great many rumors circulating not only in Washington but all over the country regarding steel and steel drums. Some people have said that steel is much freer, and that steel drums will be readily available, and that there is no need to conserve or use substitutes. The people who spread these rumors are either terribly misinformed or they do not have an over-all picture and are looking at the problem from a very narrow point of view.

Don't be misled! Open Hearth steel is short! We have enough for all of the military needs, and by using a little common sense in using Bessemer steel to the maximum extent possible, we will have enough Open Hearth steel to meet all of the essential civilian requirements.

There is a great deal of confusion as to just what is meant by an "Essential Civilian Requirement." As I see it, it is essential if the civilian cannot live and work without it. Food is essential, clothing is essential; but it is not necessary to have whipped cream and chocolate frosting an inch thick on a delicious cake. It is not essential to have silk stockings. The ladies have found this out and are doing very well without them.

Bessemer steel is not so plentiful or available that it can be used for non-essential purposes. If a product can be packaged satisfactorily in a substitute for steel, and the supply for the substitute is available in sufficient quantity, then we must consider that as far as steel packages are concerned, the product is non-essential even if the end use is essential. Let me illustrate: Suppose that borax is being used by Glenn L. Martin in making its famous bombers. The end use is important beyond any doubt, but the borax can, and should, be delivered in a bag.

The possibilities of new developments in the container field are tremendous. Before this war is over we may see materials at lower costs, with greater strength, and less weight than those with which we are now familiar. Combinations of fibers and plastics to form new materials for the manufacturing of cans on existing equipment, with only slight modifications, are not beyond the realm of possibility for packing such products as paint, motor oil, anti-freeze, turpentine, and many others.

Speed up Cylinder Turnover

The demand for high-pressure gas cylinders is tremendous. I am not in a position to give you any figures along these lines, but I urge you all to "clean house," get your cylinders into circulation, turn them over rapidly, purchase your requirements only as needed weekly or oftener, if practical. In this way you can insure a supply of gases.

Three years ago one manufacturer averaged two turns a year on acetylene cylinders. He is now averaging nine. Another manufacturer averaged four turns a year on oxygen cylinders. He is now averaging twenty-four. The best and safest way to insure a constant flow of these important gases through your plant is to see that no cylinder is allowed to stay in an inactive capacity for twenty-four hours. Your cylinders are very much like your labor. We cannot afford the luxury of absenteeism when fighting a total war.

Many of the firms in the compressed gas industry have set almost unbelievable records of increased production with existing equipment.

Paper bags have been improved during the past year so that they are now stronger, tighter, and water resistant. We have seen paper bags filled with dry hydroscopic material practically submerged in water without damage to the contents.

I have recently seen a plywood garbage container made with phenol formaldehyde resins that the manufacturer claims is water tight, lighter in weight, and able to withstand boiling water or live steam for sterilizing purposes. The developments in the field of plywood will probably have a great effect upon the post-war period.

Many of you, I know, have very serious problems in your work owing to war conditions, but may I urge that you think your problem out thoroughly before submitting it to the War Production Board? One manufacturer recently submitted PD-1A's for $9,000 worth of equipment using, among other things, a compressor and other critical materials. This application was for equipment to furnish the applicant with a supply of chemicals that was difficult to obtain only because of the shortage of containers. If the end use was important enough to the war program to warrant this $9,000 worth of equipment, it certainly would be important enough to warrant delivery of a few containers to his normal supplier. We cannot expect that every user of chlorine can be given the equipment necessary to make his own. There just aren't enough of all types of containers to allow us to furnish containers for people to expand business just because business is good.

Cotton bags have been developed that take the place of burlap and in many cases are a better package than the industry had available before the war. Actually a good many package improvements are going to grow out of the war, necessity still being the well-known "Mother of Invention."

The Chemical Division has established the Packaging Unit to assist the operating units in getting the essential packages when, and if, needed. We are simply a service organization within the War Production Board, and we try to know what the packaging needs for essential products are, and to supply this information to the Containers Division and the Requirements Committee.

I would like to give you the names of the companies and men that I have cited, but they are only a few of many that have earned the title of unsung and unknown "heroes" on the home front. While we in the War Production Board are sometimes criticized, most members of industry seem to think that we are helpful and constructive. Many times criticism is due to misunderstanding by industry and to a lack of proper information for the misunderstanding on our part. When one party made an application for 300 drums to pack a "Secret" product, I was tempted to tell him that the rating would also be secret. When we finally got together on it, it developed that there was nothing secret about his product and that he could pack it in wood barrels; but that if we knew what the product was, we would not help him get the steel drums he wanted! He was right, and we did not recommend a rating on steel drums, but we did help him to get a satisfactory wood barrel.

NEW PRODUCTS AND PROCESSES

By James M. Crowe

AS the result of a new chemical process, Libbey - Owens - Ford Glass Company has announced a new glass having a lower percentage of loss of light due to reflection.

By applying a reflection-reducing film on both surfaces of a pane of glass, the company has been able to reduce the loss of light from eight to less than one per cent. While this is not a completely new discovery in the glass industry, it is claimed to be a new and more practical method in this field of the treatment of glass by special processes.

Light rays passing through a single pane of ordinary glass lose eight per cent of their intensity as the result of reflecting or rebounding as they strike first one surface and then the inside of the other as they make their exit through the pane.

The chemical film, having a coating of only six millionths of an inch in thickness, is so equally applied that there is no distortion of vision. Glass having this new chemical treatment has not yet been placed on the market or put into mass production.

Slime Preventive

A new chemical product called Lignasan introduced by Du Pont is said to speed up paper manufacture as much as 10 per cent by retarding the formation of slime in mill machinery. This slime is created by microscopic organisms entering mills in the large quantity of water used in paper manufacture.

Lignasan has been used for several years to prevent the objectionable "blue stain" in freshly sowed lumber but only recently was its value as a slime preventive in pulp and paper mills realized.

Paper mills ordinarily shut down for a half hour daily to wash machines and pipes clogged with the bacterial slime which lowers mechanical efficiency and causes tearing of paper sheets. According to the Company this delay is no longer necessary. One mill operator reports excellent slime control on the paper machine as a result of putting five ounces of the chemical in a paper bag and tossing it into a ton of pulp in the beater.

Large quantities of chlorine, now diverted to war needs, formerly held down slime accumulation to the point where complete cleaning of equipment throughout a mill, in addition to the daily washings, was required generally once a week.

Floor Coating

Turco Products, Inc., has developed a new floor masking material called Duramask, which is said to lighten the time-wasting job of removing accumulated spillage and overspray from paint room floors.

The product is a white, thick liquid, looks and is handled much like paint. It can be applied to the floor with a kalsomine brush. It quickly dries to a hard, durable, nonskid surface which is not injured by ordinary foot or truck traffic.

When the accumulation of paint on the protective coating is so great as to require its removal, the Duramask can be dissolved with water and the paint film can be mopped away.

Duramask also can be used to protect machinery, walls, work benches and other surfaces from paint, oil or grease spillage. It is claimed to be an excellent protective floor covering for garages, grease racks and machine shops. Lubricating oil, grease and machining oil are caught on the coating and prevented from seeping into the porous cement or wood floors. At intervals the spillage can be removed simply by mopping off the water.

Wood Pulp for Powder

Research of Hercules Powder Company adapting wood pulp for the manufacture of smokeless powder has increased powder production of American, Canadian, and Australian plants, according to a recent company report.

The adaptation of wood pulp for powder manufacture has increased powder output about one quarter wherever it has been used, and freed Canada and Australia from dependence upon cotton, the company said.

Development of the new powder process was credited to Ralph L. Stern, chemical superintendent at the Parlin plant, whose experimental work on wood cellulose made possible the use of wood pulp for rifle and cannon powders. Powder usually is made from cotton. Previous attempts to use wood pulp had resulted in powder of uncertain quality and the process was slow and expensive.

Research begun by Hercules in 1934 and carried on since then has saved time and money in the war program. Experiments at the Parlin laboratory, leading to the adaptation of wood pulp, resulted not only in the use of pulp but also in the increase in output. It has been estimated that wood pulp development, based upon the difference in the cost of the cotton and wood pulp, will lower the cost of manufacture of smokeless powder at United States ordnance plants about $20,000,000 in 1943.

New Series of Dyes

The Bernard Color & Chemical Corporation is now offering a new series of dyes which, the company says, can replace many shades of anthraquinone colors now under conservation.

The Bernacet Series is an entirely new range of non-anthraquinone colors specifically produced for printing on acetate-rayon.

They comprise a wide group of amino-azo compounds. They are characteristic acetate colors in their dispersion properties and in their affinity for cellulose acetate fibers.

In many respects they are very similar to the Bernacyl colors for acetate rayon and can be used in conjunction with them. They differ only insofar as they are not produced from anthraquinone.

The company claims that they are not subject to the deficiencies usually connected with colors derived from anthraquinone derivatives. For example: they are fast to gas fumes, exceptionally fast to sublimation and are dischargeable by the zinc formaldehyde sulfoxalate process.

New Wax

A new product called Pennwax has been introduced by Petroleum Specialties, Inc. This new wax is white and has a melting point of 126-127° F. The company recommends it for the paper and carton industries for moisture-proofing and for laminating purposes. It is also of interest to large users of paraffin wax for extending scarce supplies and as a plasticizer in blending Pennwax with brittle paraffin waxes.

Bleaching Process

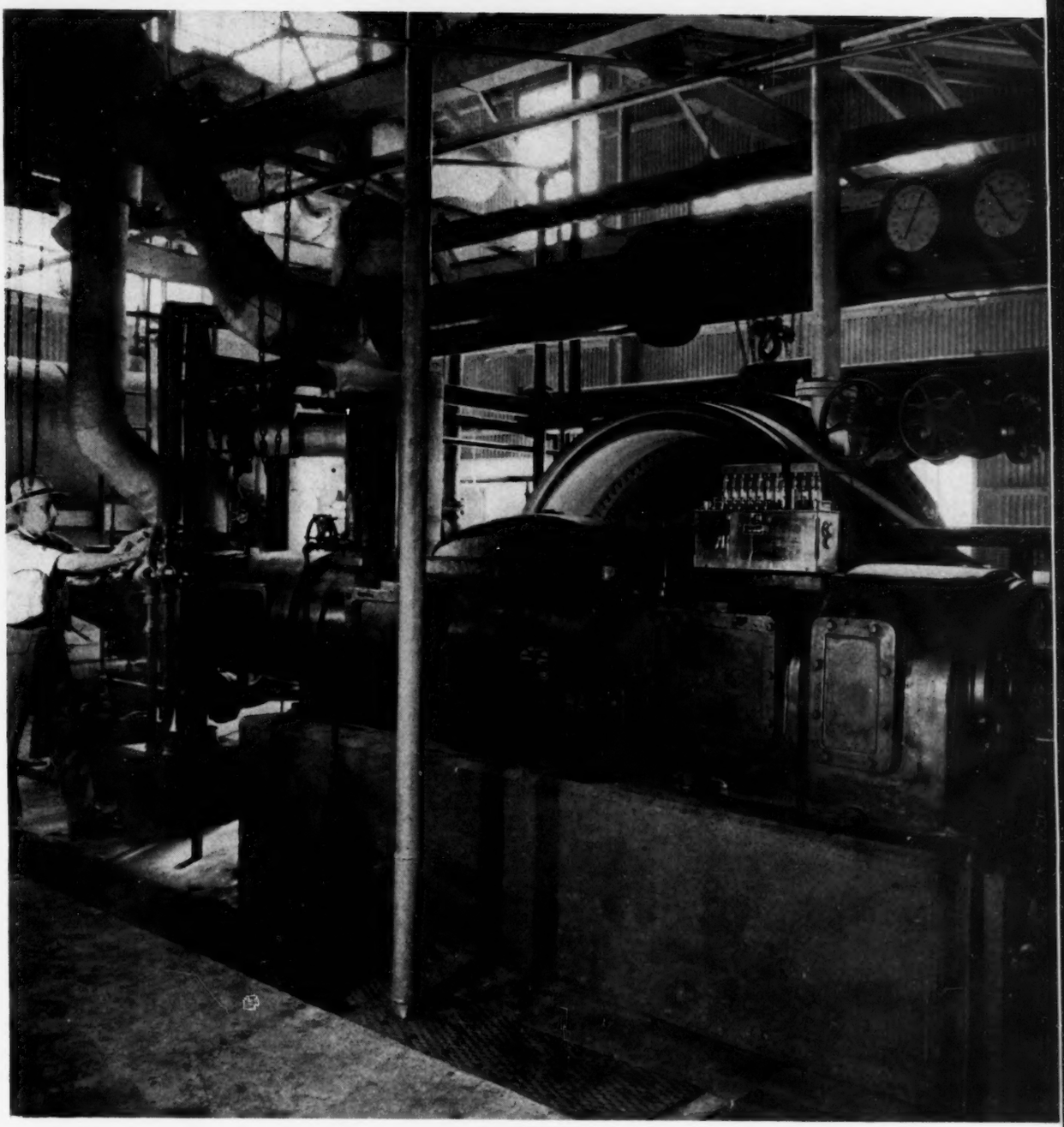
Production of military textiles is greatly speeded by a new continuous bleaching process which turns cloth white in two hours at rates up to 200 yards per minute, according to E. I. du Pont de Nemours & Company.

"Kier" or "batch" bleaching, a method which requires 8 to 24 hours, is replaced by this continuous bleaching with hydrogen peroxide.

The process not only hastens the bleach but allows precise control of all conditions—speed, steam, chemical absorption, and other factors—from start to finish. It is said that uniform color and appearance is obtained and that fabrics thus bleached take on dyes and other finishing materials with absolute evenness.

Correction

Last month there appeared in this column an item entitled, "Wax Substitute," which began "According to Stroock & Wittenberg, one of their waxes, S & W Fused Congo No. 5 . . . ." We regret that this product was referred to as a wax due to an error on our part. We have been informed by Stroock & Wittenberg, the manufacturer, that this product, although used in certain compounds to replace wax, is nevertheless a gum or resin and not a wax.



PLANT OPERATION AND MANAGEMENT

This interesting photo shows a large compressor used in making liquid and solid carbon dioxide. For interesting story on the uses and methods of handling liquid and solid CO_2, see next page.

Digest of New Methods and Equipment for Chemical Makers

The Chemical Uses and Methods of Handling

Solid and Liquid Carbon Dioxide

By

Chas. T. Longaker
Manager

Carbon Dioxide Division, The Mathieson Alkali Wks. (Inc.)

Feed end of lime recovery plant at Saltville, showing in background the towers used in purifying lime kiln gases for manufacture of dry ice and liquid carbon dioxide.

In this fourth article in a series devoted to the applications and handling of chemicals, the author discusses carbon dioxide, which has become a versatile and important product in a relatively short time.

ACCORDING to the latest available figures, more than 175,000 tons of solid carbon dioxide and over 50,000 tons of liquid carbon dioxide are produced every year in this country.

At present, both of these products must be classed as specialties. About 70 per cent of the solid is used for refrigerating purposes by the ice-cream trade; and over 90 per cent of the liquid, together with a considerable percentage of the solid, is used for carbonating beverages. Both forms, however, are finding an ever increasing number of applications in many industries, including the chemical industry.

Of course, neither of these forms is employed as a source of supply for chemical processes using carbon dioxide in large quantities, such as the manufacture of soda-ash or urea. In these cases, the gas is usually generated from limestone in locally operated kilns, or, if a dilute gas can be used, as in white lead making, flue gas, which contains from 15 to 20 per cent of carbon dioxide, may be utilized.

But when extremely pure carbon dioxide in relatively small amounts is wanted, it can, as a rule, be most conveniently and economically obtained by using either of the "prepared" forms, as these are free from all impurities except a few thousandths of one per cent of water and noncondensable gases.

Whether the liquid or the solid product is the more economical as a source of carbon dioxide gas for chemical purposes normally depends upon several factors. The liquid costs more per pound because transportation charges, two ways, must be paid on the cylinders in which it is shipped. On the other hand, the solid is subject to some loss in transit and cannot be shipped too far from the source of supply, and, when used to supply gas, requires a "liquefier." The liquifier is a pressure tank in which the solid material is placed and from which the gas formed by sublimation is withdrawn as desired. However, in these days when there is a shortage of cylinders and transportation facilities are overburdened, the solid form should be selected whenever possible.

Chemical Applications

Pure carbon dioxide, obtained from one of the prepared forms, is regularly used for making sodium salicylate from sodium phenolate by means of a reaction that proceeds as follows:

$$(C_6H_5)\,ONa + CO_2 \rightarrow (C_6H_5)\,O.COONa \rightarrow (C_6H_4)\,OH.COONa$$

sodium phenolate — intermediate compound — sodium salicylate

This same reaction is applicable in preparing other organic compounds.

Reduced with carbon, or with hydrogen in the presence of a suitable catalyst, carbon dioxide is a convenient source of pure carbon monoxide, used in making oxalates, formates, phosgene, and carbonyl compounds. However, oxalates can also be made direct from carbon dioxide by allowing it to react with metallic sodium or potassium, as amalgams, although no commercial use of this process is known.

Other compounds that can be made with carbon dioxide and hydrogen under the influence of catalysts include methane and formaldehyde.

The selective solvent action of liquid carbon dioxide may, at times, be useful to chemists. A few compounds, such as naphthalene, camphor, and paradichlorbenzene, dissolve in it readily and can be quickly recovered from solution, uncontaminated, by allowing the solvent to evaporate.

Carbon Dioxide as an Acid: As shown by the following table, carbon dioxide is one of the cheaper sources of hydrogen ions, which are liberated together with CO_3 ions by the ionization of H_2CO_3, formed when carbon dioxide comes into contact with water.

Source of H + Ions	*Cost Per Ton*	*Tons Required Per Ton of H + Available*	*Cost of H + Per Ton*
Solid CO_2	$60.00	21.8	$1308.00
H_2SO_4, 66°	16.50	52.2	861.30
HCl, 20°	23.00	115.0	2045.00

Hence, for producing acidity, carbon dioxide costs less than hydrochloric acid, and, while more expensive than sulphuric

acid, may be preferred at times for the following reasons: it can be obtained in so pure a form, it has little effect on the common metals of construction; and, in many reactions, it can be removed by heating without leaving a residue.

At ordinary atmospheric pressure, carbon dioxide dissolves so slightly in water that the acid formed under these conditions is too weak to be of much practical value, but, under a pressure of 15 lbs. per square inch, it forms solutions having a pH of from 3.5 to 3.7, depending upon the temperature. Its use as an acid, therefore, is feasible in processes that can be carried out under pressure.

For example, it has been shown experimentally that carbon dioxide under pressure is both more economical and more satisfactory than hydrochloric acid for converting starches into sugars by hydrolysis.

On the other hand, in processes where the CO_3 ions are constantly being removed from the reaction by chemical combination, the acidic properties of carbon dioxide can be utilized at normal pressure.

This type of reaction is illustrated by a recent application of carbon dioxide in the finishing of cotton goods. The standard procedure is: "boil out" the goods in a kier in a caustic soda solution; wash; "sour" in sulfuric acid to destroy traces of the caustic; wash; treat with a solution of soda-ash to neutralize the residual acid; and wash again.

In the new process, carbon dioxide is substituted for the sulfuric acid, and, as it changes the traces of caustic directly into the harmless bicarbonate, one step in the process is eliminated.

Other chemical processes in which carbon dioxide in one of its prepared forms may find use include: the removal of lime from cane-sugar liquors, the neutralization of alkalies in the preparation of fatty acids, the precipitation of rosin from rosin soap in sizing paper, the removal of boiler scale by changing the insoluble carbonates of calcium and magnesium into the soluble bicarbonates, and the aging of cement by carbonating its content of free lime.

Other Applications

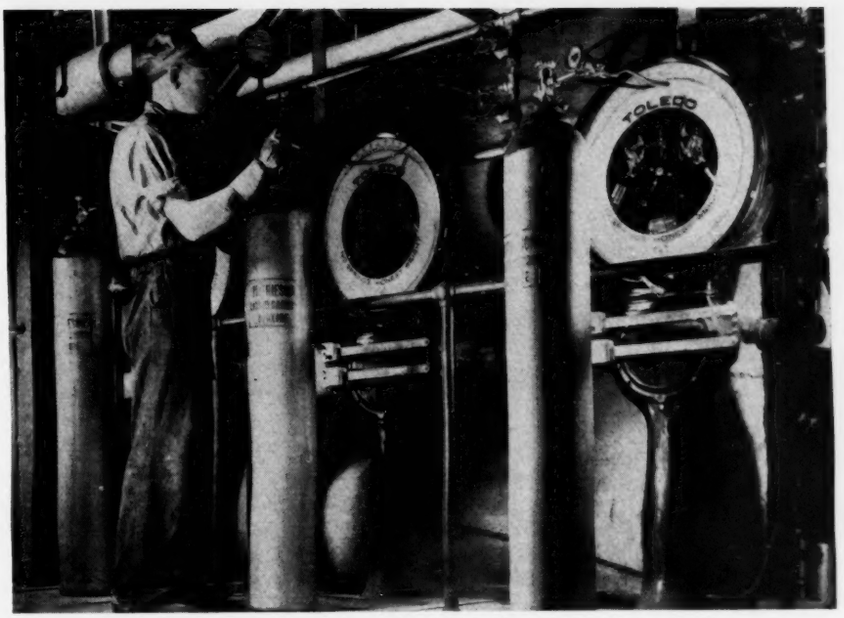
In addition to the purely chemical applications of solid and liquid carbon dioxide, the following will be of interest to the chemist:

Protecting combat planes from tracer bullets by flooding spaces in and around the fuel tanks with carbon dioxide gas just before action.

Inflating the rubber boats and life preservers used by aviators.

Producing inert atmospheres to prevent fire, explosion, or damage to products or equipment when oxidizable materials are being heated, pulverized, or otherwise treated.

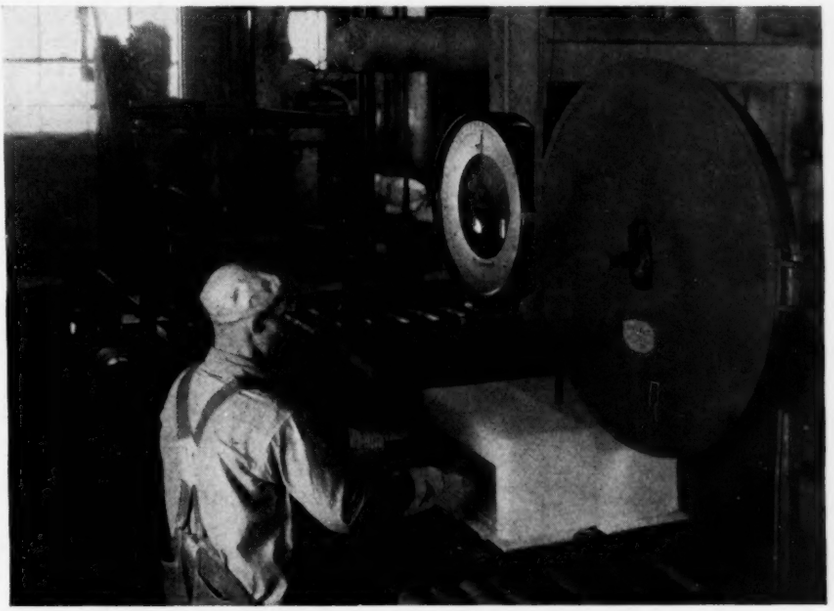
(*Continued on page 240*)



Above, Filling fifty-pound cylinders of carbon dioxide.

At the right, Battery of dry ice presses and control station at Saltville plant.

Below, Sawing 20″ x 20″ x 10″ blocks of dry ice into standard 10″x10″x10″ cubes.



PLANT OPERATIONS NOTEBOOK

By W. F. Schaphorst

CHART FOR SELECTING SAFE WOODEN BEAMS

Here is a handy and simple chart for selecting safe beams made of the ordinary woods such as shortleaf pine, white oak, longleaf pine, Douglas fir, western hemlock, white pine, and spruce. It is based on data adopted by the American Railway Engineering Association for safe uniformly loaded beams of rectangular section.

To use the chart simply zigzag a straightedge across three times, or stretch a thread across three times as indicated by the zigzag dotted lines, and the problem is solved.

For example, it is desired to hold 200 lb. per foot of length on a wooden beam of western hemlock, 2 in. by 6 in. over a span of 6 feet. Will the beam be safe?

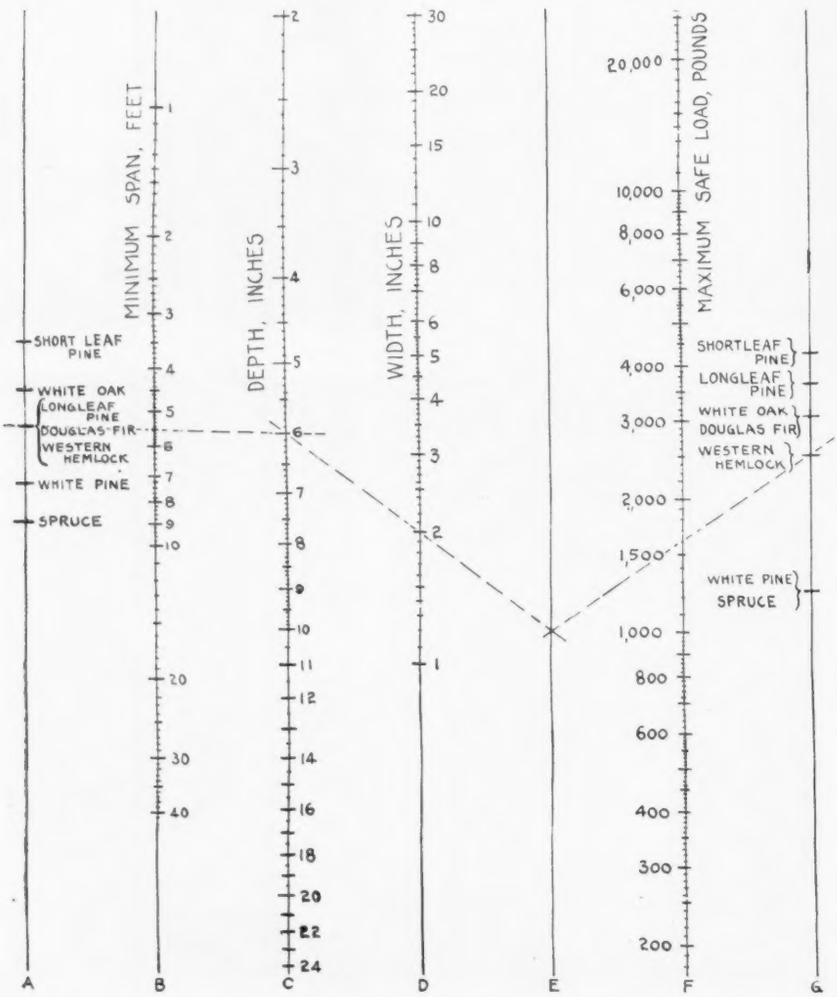
Run a straight line from the point in column A opposite "western hemlock" over to the depth 6 inches in column C. The intersection with column B shows the minimum span to be 5.5 ft. The beam will therefore be safe as regards span.

Then from the depth 6 in column C run a straight line through the width 2 in column D and locate the intersection in column E. Then from that point of intersection run a straight line over to the point in column G opposite "western hemlock." The answer is found at the intersection with column F and it is 1600 pounds.

Since it is desired to hold only 6 x 200 or 1200 lb. on the beam, and since the beam will actually hold 1600 pounds, it certainly is amply safe. In fact, the chart shows that a beam made of shortleaf pine or white oak would be safe under the same load.

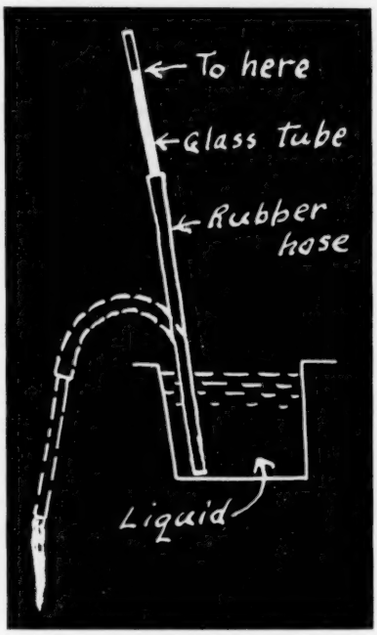
Inversely the chart may be used for finding any unknown factor or factors. If the kind of wood and the span are known the first straight line through columns A, B and C gives the minimum depth of beam which must be used. If the width of beam is unknown the line through the columns E, F, G is located next, and lastly the line through columns C, D, E gives the minimum width of beam in column D. It is all so simple that further explanation is considered unnecessary.

The weight of the beam itself is included in the safe load given in column F, hence the user of the chart need not worry about that point.



Siphon Slant

Ever get any unwanted water or other liquid into your mouth while starting a siphon? This writer has, and the "taste" has lingered for some time. Heretofore the starting of a siphon has not been enjoyed by the writer. Now he does enjoy even that by making the simple addition of a glass tube to the hose as shown in the accompanying sketch.



By using a glass tube you are enabled to "see" the liquid as it comes up. You can then stop the liquid wherever you wish, before it reaches your mouth, at the point marked "To here" in the sketch. Then pinch the tube with your fingers to prevent back flow, place your finger over the end of the glass tube to hold the vacuum, lower the free end to the position shown dotted, and no trouble whatever will be experienced.

A glass tube, also, can be kept clean easily so that, to create the initial vacuum, one is not likely to use one's mouth with any hesitancy.

This method is also quicker, surer, and better than starting by laying the hose in the liquid and stopping both ends, or filling the hose with a funnel and dipper, etc. This method always works the "first time."

INDUSTRY'S BOOKSHELF

Industrial Instruments for Measurement and Control, by Thomas J. Rhodes, McGraw-Hill Book Company, Inc., N. Y.; 573 pp., $6.00.

The enormous increase in the number of instruments and controls used in industry, and the growing complexity of the problems attending their design, installation, and maintenance attest to the need for specific study of instruments. One of the Chemical Engineering Series, this book is intended to be used as a textbook for the formal study of the subject in engineering schools and as a practical reference for those concerned with instrumentation and automatic control in industry. Forming the basis of the work are the theories and applications solving instrument problems, rather than descriptive material on all available types and kinds of controls.

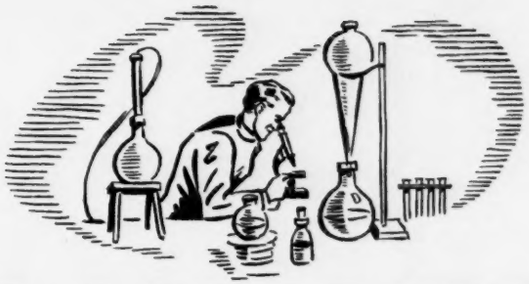
The four fundamental physical and thermal quantities encountered by the chemical engineer in industrial processing and manufacturing are: temperature, pressure, fluid flow, and liquid level. Introducing the science of instrumentation, these four factors, their standards, and the different types of calibrating and testing equipment are covered in the first chapter.

The text then clearly describes the engineering details underlying the design and construction of pressure and vacuum gauges, indicating and recording thermometers, high-temperature pyrometry, the theory of differential-pressure flow meter primary measuring instruments, differential-pressure flow meter secondary measuring, recording, and integrating elements, miscellaneous inferential and volumetric flow meters, liquid-level measurement, telemetering, automatic-control theory, and automatic-control mechanisms.

A representative group of industrial instruments that have special applications, such as the continuous CO_2-gas analyzer, the hydrogen-ion concentration meter, are studied in the final chapter. Appended are orifice coefficient tables for vena contracta and flange taps.

Those interested in the analysis of automatically controlled continuous processes and in practical rules for the design and maintenance of controlling instruments will find themselves frequently referring to these pages.

(*Continued on page 241*)



THE LABORATORY NOTEBOOK

Mobile Electron Microscope

A new simplified electron microscope that is a compact and mobile unit which can be plugged into regular 110-AC circuit has been designed by Drs. C. H. Bachman and Simon Ramo of the General Electric Electronics laboratory. Development of the new device which is capable of producing images 10,000 times the size of the subject makes it possible for small laboratories and war plants to use the instrument for solving immediate war and post-war problems.

Differing from earlier electron microscopes, the G-E instrument applies electrostatic focusing to the beam of electrons instead of electromagnetic focusing. These electrostatic fields act as electronic lenses, guiding the paths of electron waves through the instrument just as glass lenses guide light through ordinary optical microscopes. The simplification has reduced the bulk and complexity of the machine, resulting in relative ease of operation.

In the new G-E microscope the beam of electrons passes through the specimen inside a vacuum chamber and produces a visible picture on the fluorescent viewing screen. This image can then be photographed outside the tube, and, if desired, enlarged many thousand times the original size of the specimen for a wall print known as an "Electronmicrograph." Formerly the photograph was taken inside the vacuum chamber.

Other features of the new unit are the elimination of the need for water supply, and ease in inserting specimens.

The microscope uses the relatively small electron waves instead of light waves because their shorter length makes possible the study of much smaller objects than could be achieved with visible light waves. Light travels in waves of about 1/42,000th of an inch in length, and objects must be at least half that long before they can be seen under the ordinary microscope. Prior to the electron microscope, when objects to be viewed were smaller than this, it was impossible to obtain sharp images, so that further useful magnification at that wave length became impractical.

The new microscope has an overall height of 52 inches, and requires floor space of about 2′ x 3′. The cabinet includes the power supply, the mechanical vacuum pump, and an air-cooled, oil-diffusion high vacuum pump. A camera is provided for mounting on the front of the instrument when photographic reproduction is desired. The cabinet is mounted on castors for mobility, and weighs 600 lbs. No special facilities are needed for operating the instrument, and the unit includes the microscope proper and all auxiliaries.

Electronic Photometer

An electronic photometer has been designed by the Photovolt Corp. to register low light values. The instrument comprises a phototube and a high-gain DC amplifier; it is operated from the power line without the use of batteries and stabilized for line voltage variations.

For measurements in the visible as well as in the infra-red and ultraviolet ranges, the photometer can be furnished with phototubes of various spectral characteristics. It can be applied to measure the light output of luminous paints, fluorescence, ultraviolet absorption of solutions, glass, and plastics, infra-red reflection of paints, focal plane readings in photomicrography and metallography, etc. Because of its high sensitivity the instrument will record thin light beams as in the evaluation of spectrographs, radiographs, and photographic negatives.

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And here's what Mr. J. M. Barr, Assistant General Manager, of Vought-Sikorsky Aircraft, says about how well Crown is doing its part of the job:

"Mr. Schramm says the fit is excellent and the workmanship leaves nothing to be desired . . . It is the desire of this division to take pride in the work of its subcontractors and we certainly feel justified in the case of the Crown Can Company."

"The workmanship leaves nothing to be desired." Thank you, Mr. Barr!

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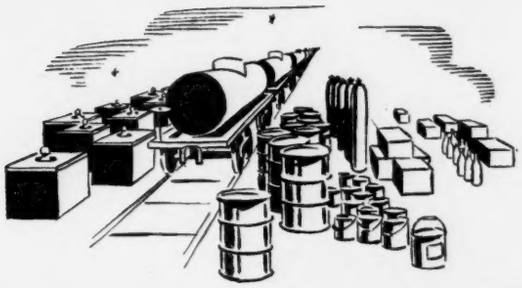


PACKAGING & CONTAINER FORUM

By Richard W. Lahey

Drum Reconditioning by Newark Steel Drum Company The Sandblast Process

THE necessity of conserving steel drums now available is one of the serious problems facing the chemical industry. Neither new nor used drums can be purchased for packing many products, and the industry is forced to conserve containers it now has available.

A steel drum, properly handled by the packer and the packer's customer, and if properly reconditioned after each use, can make many trips before its useful life is at an end.

Steel drum reconditioning is not new to the chemical industry. Many products long have been packed in returnable and "second-hand" drums.

Some manufacturers have been doing their own drum reconditioning, while others have had commercial drum "laundries" handle this work for them. The importance of commercial reconditioning plants to the chemical industry has grown recently because of the greatly increased number of drums which must be reconditioned.

The Newark Steel Drum Company, with a large plant at Linden, New Jersey, is one of the pioneer, and probably the largest steel drum "laundry." This company has introduced cleaning practices that have been adopted by similar commercial plants, and incorporated in drum cleaning departments of drum users.

Production of the Linden plant is above one-half million reconditioned steel drums a year, and they often store up to 90 thousand drums. The company normally buys used drums, reconditions them, and then sells the cleaned drums—but under WPB regulations used drum purchases are regulated, and now by far the greatest part of the drums reconditioned are owned by other companies.

Drums arrive at the plant by rail and truck. To prevent internal corrosion covers of full-removable-head drums and bungs of tight-head drums are left on to keep rain and moisture out, and to prevent, as far as possible, exchange of air and moisture within the drum while stored in the yard.

Below, Left. Streams of steel abrasive, centrifugally thrown by two fast-revolving wheels, strip paint, rust and dirt from exteriors of drums shown entering this machine. Center. An inverted open-end drum is being charged into this machine for interior cleaning by an abrasive blast stream. Right. Covers of open-end drums are cleaned as the flat table of this machine passes under an abrasive-throwing wheel.

Cleaning Operations

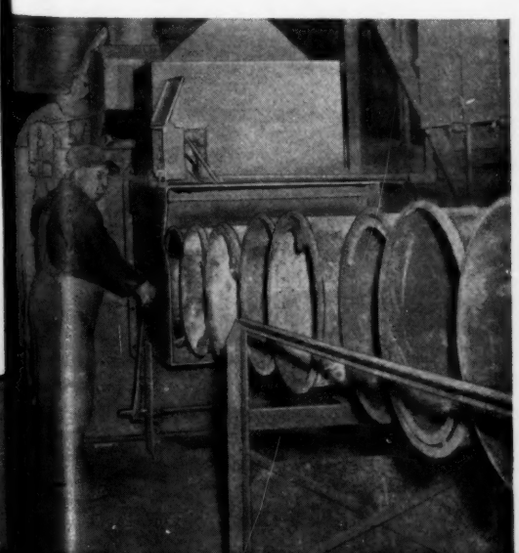
Cleaning operations at Newark Steel Drum Company differ from those of other drum cleaning plants in that equipment employing an abrasive blast stream is used to clean the exterior of tight drums, and the covers and interiors of ful-removable-head drums. The insides of tight-head drums are cleaned in the conventional manner—by soaking and flushing in a solution. The type of solution is varied, dependent upon use to which the drum previously had been put.

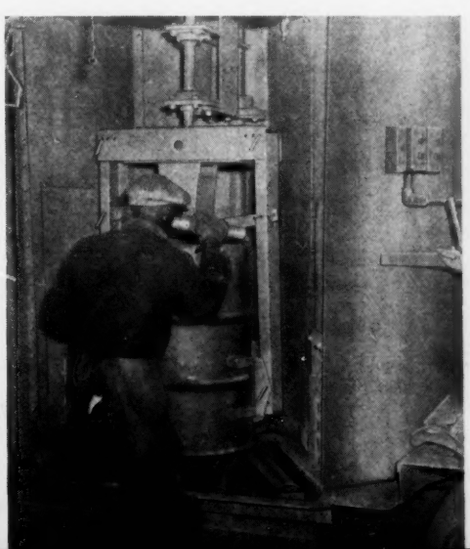
Drums are placed on an inclined track or conveyor leading to an American Wheelabrator blast cleaning machine. In this machine, drums are introduced one at a time and subjected to abrasive blasts thrown by two centrifugal wheels as the drums are spun on rollers under the abrasive-throwing wheels. The abrasive blast strips the drum exteriors of all paint and rust, and the machine is designed to handle 150 drums an hour.One man charges the drums into the machine, and another receives the drums as they are discharged.

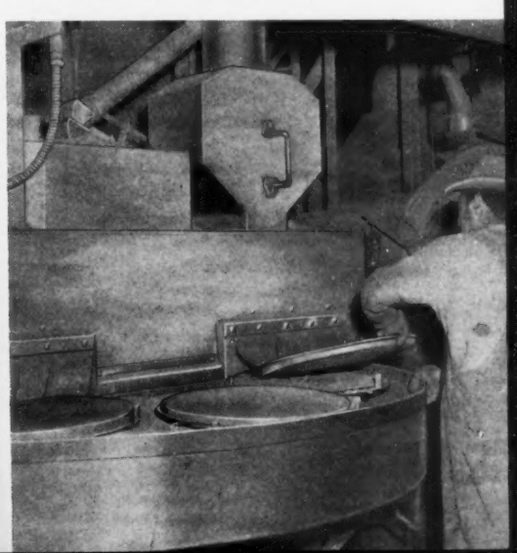
Not Limited to Drums

This cleaning method, while thus far limited in drum cleaning applications to the Newark Steel Drum Company's Linden plant, has been in use by thousands of plants in the metal industry for cleaning castings and forgings of sand, scale or rust. Two centrifugal airless abrasive-throwing wheels, or blast units, are placed in this machine so they clean ends and sides of the drum. The wheels are driven by individual motors, and turn 2250 revolutions per minute to propel steel abrasive against the drums at 11,500 feet per minute. Revolving action of the drum subjects every part of its exterior surface to the full effect of the abrasive blast streams.

Another American Wheelabrator blast cleaning machine, also specially designed for drum cleaning, is used to clean the interiors of full-removable-head drums. The open drum is inverted over a single abrasive-throwing wheel, and revolves as it is cleaned. In operating the machine, the operator places one drum on the loading station, while a drum previously loaded is being cleaned. As the clean drum is discharged from the machine, the







drum to be cleaned enters the cleaning chamber and is positioned automatically over the abrasive-throwing wheel. The operator can control the cleaning time.

The force of the abrasive on the steel drum not only provides a truly clean surface, free of dirt and other foreign matter, but it slightly roughens the metal. This roughened surface is particularly desirable when drums are refinished, as the paint or other coating makes a better bond than on a new steel drum or on a drum that had not been subjected to the abrasive blast. Certain synthetic resins used for lining drums for certain chemical products, could not be applied as satisfactorily to steel drums with a smooth finish, but adhere perfectly to drums blast cleaned by this method.

A third blast cleaning machine is used to clean the removable covers of open-end drums. The covers are placed flat on a revolving table that passes the work under an abrasive wheel within the machine. Covers are turned over and passed through the machine a second time to clean the opposite side.

Abrasive Reused

Abrasive used by the three blast cleaning machines is automatically separated from rust, dirt, paint and product removed in the cleaning process, and then returned to hoppers above the centrifugal abrasive-throwing wheels for reuse. The machines are grouped together, and are vented through a single cloth-bag type dust collector.

Cleaned drums are inspected and graded—some to be painted, others to be relined and painted. Drums are completely assembled and ready for delivery before spray painting the exteriors, and any color or combination of colors is used to comply with the customer's specifications. Many full-removable-cover drums reconditioned by Newark Steel Drum Company are inferior finished or lined with synthetic resins before exteriors are painted. Finishes are baked in high temperature ovens.

I.C.C. Transportation Regulations Amended

The I.C.C. issued amendments to the Regulations for the Transportation of Explosives and Other Dangerous Articles on December 30, 1942 which will be found in the Federal Register of January 6, 1943, pages 240-241. These additions were issued without public hearing and without the customary 20 days notice. The changes became effective on December 30, 1942.

Those changes of particular interest to the Chemical Industry are as follows:

1. *Sec. 101. Tank Car Shipments of Inflammable Liquids.* Because of the emergency, for shipments made from October to April only, inflammable liquids having a vapor pressure not exceeding 16 pounds per square inch, absolute, at 100°F. may be loaded not to exceed 98 per cent of the combined shell and dome capacity of the tank car. Previously, no inflammable liquids could be loaded in the domes of tank cars.

2. *Sec. 110 (b) (5) Inflammable Liquids flashing above 20°F. and not over 80°F.* Wooden whiskey barrels are authorized for transporting these liquids, provided, the char is removed, they are properly recoopered, and they comply with all provisions of Spec. 10B. The makers' marking requirements as prescribed by Spec. 10B must be applied by the reconditioner.

3. *Sec. 113. Paint, Enamel, Lacquer, Stain, Shellac.* Spec. 37E metal drums was added to the approved list of containers for transporting these liquids, provided the flash point is above 20°F. These drums must have welded side seams, be fabricated of 24 gauge steel and cannot be over 8½ gallons capacity.

4. *Sec. 204 (e) Sodium Hydrosulfite.* The amendment of Oct. 28, 1942 which authorized the use of the Spec. 21A fiber drums without inside metal containers was further amended as follows:

"Spec. 21A fiber drums which must be lined or coated, or otherwise treated so as to prevent the entrance of moisture in quantities sufficient to create a hazardous condition in transportation: drums to withstand 2 drops from height of 4 feet in same spot or one 6 foot drop, in place of drop test as provided in Spec. 21A; maximum loaded capacity 250 pounds net."

5. *Sec. 207 (b) (6) Sulfide of Sodium and Sulfide of Potassium.* The amendment of December 12, 1942 approving Spec. 21A fiber drums has been further amended as follows:

"Spec. 21A fiber drums which must be lined or coated, or otherwise treated so as to prevent the entrance of moisture in quantities sufficient to create a hazardous condition in transportation: drums to withstand 2 drops from height of 4 feet in same spot or one 6 foot drop, in place of drop test as provided in Spec. 21A; maximum loaded capacity 250 pounds net."

6. *Sec. 329 (b) (2) Chloropicrin Mixtures.* The maximum size of the Spec. 5A drums with welded seams has been increased from 33 gallons to 55 gallons provided the mixtures do not contain more than 15 per cent chloropicrin.

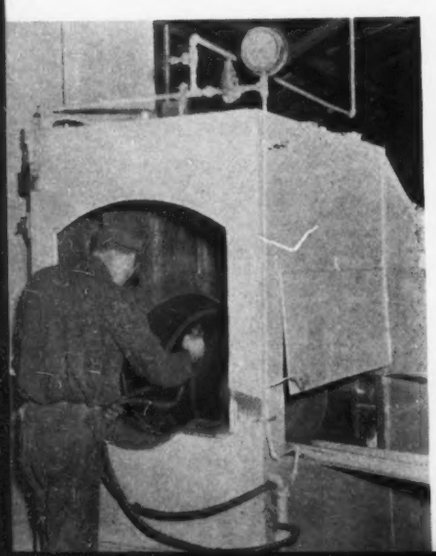
7. *Sec. 357 (a) (11) Cyanides and Cyanide Mixtures.* Amendment of July 14, 1942, authorizing use of Spec. 21A fiber drums, has been changed as follows:

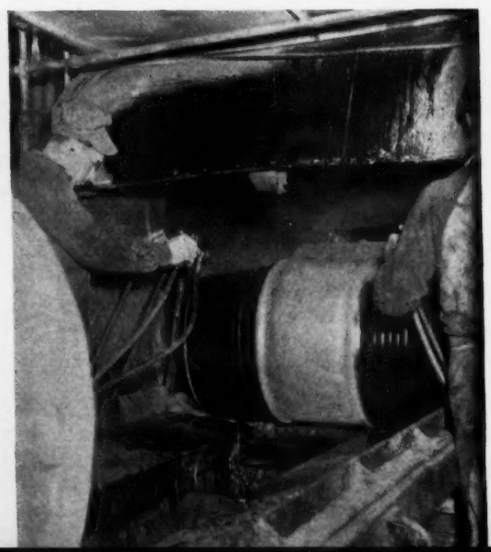
"Spec. 21A fiber drums which must be lined or coated, or otherwise treated so as to prevent the entrance of moisture in quantities sufficient to create a hazardous condition in transportation: drums to withstand 2 drops from height of 4 feet in same spot or one 6 foot drop, in place of drop test as provided in Spec. 21A; maximum loaded capacity 225 pounds net."

8. *Container Specification 10A. Tight Wooden Barrels.* This change covers reduction in the gauge of head hoops from 16 to 17 gauge. Barrel manufacturers may also eliminate marking the date of manufacture, required with other data, to be branded on each barrel.

9. *Container Specification 10B. Tight Wooden Barrels.* The changes in this specification allow the reduction from 8 to 6 steel hoops (2nd quarter hoops eliminated) for the 50 gallon size. Also in barrels of 5 gallons maximum size, the steel hoops are reduced from 6 to 4 by eliminating first quarter hoops provided head and bilge hoops are 1¾ inches wide and of 17 gauge steel.

Left. Synthetic resins applied in this booth adhere firmly to interiors of drums shot-blasted. Right. Exteriors of cleaned drums are spray-painted.



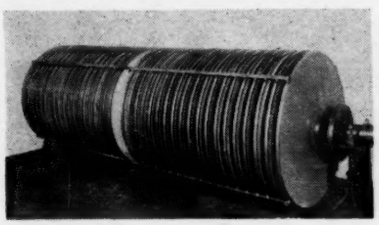


NEW EQUIPMENT

Rotary Filter QC222

A sturdier leaf design has been incorporated in a new rotary leaf clarification filter built by the Swenson Evaporator Company, Division of Whiting Corporation.

The specially designed leaf produces a uniform tautness of screen, said to give longer screen life and eliminate the customary clamping rings and bolts.



The element illustrated contains forty, 44½-inch diameter leaves and will be used for the clarification of 50% cooled electrolytic caustic solution to give a polished filtrate.

Coolant Pumps QC223

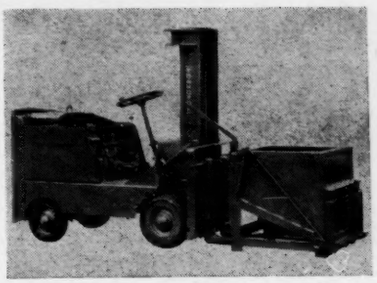
A number of new coolant and circulating pumps have just been announced by Ingersoll-Rand Company. These new pumps include ¾″ and 1″ side-wall-mounted types, a 1¼″ side-wall-mounted type for low-submergence applications, and a 1¼″ horizontal type.

These new machines are additions to the line of coolant pumps previously available which include ¾″, 1″, and 1½″ immersion-type pumps and a 1¼″ side-wall-mounted-type pump.

These pumps are particularly suitable for installation on machinery requiring a coolant or circulating unit; for example, those types of lathes, drills, automatics, cut-off machines, and grinders which require a constant supply of cooling fluid or cutting oil. Other equipment for which these pumps are suitable includes evaporative condensers, air-conditioning units, washers, etc.

Lift Truck Hopper QC224

To make possible a standard method of handling hopper-contained bulk materials in a wide variety of production operations, Towmotor Company has developed a hopper attachment which demonstrates that flexibility essential to efficient performance on individual, specialized jobs can be attained with standard lift truck models.



Designed for use with standard fork equipment, the hopper is available in various sizes, that illustrated having a capacity of 17½ cubic feet. To provide a firm carrying position and permit rapid tilting in dumping hopper loads, the attachment is carried directly on the fork support bar of the lift truck by means of a hook arrangement which is an integral part of the hopper. As shown in the accompanying photograph picturing forks in a lowered position, ample clearance beneath hopper allows handling without removal of standard forks. Hopper gate is opened for discharge by pulling down a hand lever positioned within easy reach of operator, while quick, complete emptying is assured by the slanting hopper bottom. The gate is closed by gravity and is secured by an automatic-catch latch.

Especially suitable for efficient, economical handling of small parts and bulk materials chuted from storage bins or discharged from production machines, the hoppers afford a practical means of collecting materials at production or processing points and quickly transporting them to other locations. As independent units they can be placed for filling while the Towmotor is busy on other jobs, then picked up and delivered to the next destination.

Pump for Synthetic Latex QC225

A pump developed especially for handling the butadiene-styrene mixture which forms chemical rubber later has been announced by Milton Roy Pumps.

This pump employs the typical step-valve design with double-ball checks but modified slightly to enable the latex to be handled with an absolute minimum of turbulence. The discharge checks are spring-loaded to enable them to seat instantly and positively in handling this particularly viscous material.

This pump was developed over a period of two years through close cooperation with Goodyear engineers in Akron and is now in use in the Goodyear and the Goodyear-supervised Government plants in Akron.

It is an opposed-end duplex pump designed to utilize the suction pressure, present in the butadiene-styrene mixing vessel, and pump against a greater pressure on the discharge end.

An important feature of this unit is the close plunger-stroke adjustment by means of which the volume of latex handled is precisely controlled, from maximum pump capacity down to as little as desired, even to the rate of quart per hour if necessary.

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The Chemical Business Magazine

522 FIFTH AVENUE

NEW YORK, N. Y.

It is stated that this latex pump is self-cleaning and non-clogging, requires only the usual operating attention, doesn't even need cleaning except after having been shut down for an hour or more. This pump is available in capacities up to 3,000 gallons per hour.

Similar type Step-Valve Pumps, in capacities up to 2,600 g.p.h. are being used to pump distillates, butane, glycol, propane and other related petroleum products and to handle various chemicals and intermediates in processing, also to pump against as high as 20,000 lbs. pressure per square inch in high pressure synthesis.

Fibre Conduit QC226

In view of the metal shortage interest has been shown in the possibilities of fibre conduit such as Bermico, a product of Brown Company, manufacturers of wood cellulose products.

In the production of Bermico, wood cellulose fibres are scientifically built up and heat-treated to form tubes with a solid homogeneous wall structure. These tubes are then impregnated by a special process to produce a chemically inert, light weight pipe with high mechanical strength and water resistance. Significantly, Bermico is made 100 per cent from non-critical materials.

Millions of feet of Bermico are put under ground each year for the installation of electrical cables. Lately Bermico fibre conduit has been used in place of critical metal conduit. Another new application is for inside drain pipe to carry off rain water. Bermico is also now being used as a protective jacket to prolong the life of metal pipe exposed to corrosive action of liquids or gases.

In addition to the uses already mentioned, certain types of Bermico seem to offer possibilities as a soil pipe, as well as for drainage lines and as casing in shallow oil wells. Other private experiments are being conducted to determine the adaptability of Bermico as a wartime alternate for specialized applications.

Magnetic Starters QC227

A new line of alternating-current combination magnetic starters for full-voltage starting of induction motors up to 7½ hp. has been announced by the General Electric Company.

Available only in NEMA sizes 0 and 1 as yet, these starters consist of a fusible motor-circuit switch and a magnetic starter incorporated in one compact unit to conserve space and installation time, to provide greater protection for equipment and operators, and to improve appearance. Also, to facilitate mounting groups of the starters close together, the operating handle is projected through the front rather than the side of the case.

The motor-circuit switch has silver-surfaced, snap-action contacts of the roller type which easily break stalled motor current. New Vystipe fuse clips hold the fuses securely in place by means of screw fasteners at each end, assuring good contact and preventing the fuses from being displaced if subjected to short-circuit conditions. Forms are also available with thermal circuit breakers in place of the fusible motor-circuit switch.

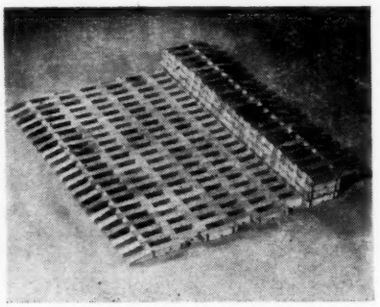
Bimetallic overload relays are adjustable for either hand or automatic reset and protect the motor from overheating caused by repeated overloads, sustained overloads, or too frequent starting. All terminals are clamptype, front-connected. The double-break contact tips are silver-inlaid and of the self-cleaning type.

The starters are enclosed in general purpose, cabinet-type, all-welded steel cases. The flush-type doors of the cases close into deep L-shaped flanges, making a particularly tight joint between the case and the cover. An interlock prevents opening the door until the switch is OFF.

Wood Matting QC228

The development of substitute materials in the manufacturing of matting became a necessity when rubber and other materials were put on the critical list, if the safety, sanitation, and comfort features of matting were to continue available.

The research staff of the American Mat Corporation have come up with a number of substitutes. It is said that in some instances the new types stand up even better than the originals.



The most recent development, flexible wood link matting, has just been announced by the company. This mat is substantially constructed of wood links. It is light in weight and can be rolled or folded up for easy handling and cleaning. Lying flat, it follows the contour of the floor.

Flexible Wood Link Matting makes for safety underfoot, is comfortable to stand on, and affords good drainage. The ends are beveled to reduce the danger of topping. It comes in natural wood color. The mat is 1″ thick, and comes in stock sizes; 18 x 32″, 24 x 38″, and 30 x 44″, but can also be obtained in special sizes of any length and up to 36″ in width.

* * * * * * * * * * * * * * * * *

For more information, circle the reference numbers on the postcard below Give your name, company and address. Detach and mail. No stamp required

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SO critical was this material that for a time its scarcity amounted to almost total absence of supplies for America and her Allies • The cessation of imports from Central Europe sent prices skyrocketing and industries dependent upon this chemical had a very tough time.

America is happily independent of foreign sources for her supplies of Caustic Potash • From inexhaustible deposits in California and New Mexico come ample supplies of Potash Salts from which are produced Caustic Potash and Carbonate of Potash.

ISCO Caustic Potash (88-92% KOH) is available for prompt shipment from spot stocks at New York and our branches, in the following forms: SOLID • FLAKE • GRANULAR • BROKEN WALNUT • LIQUID 45%

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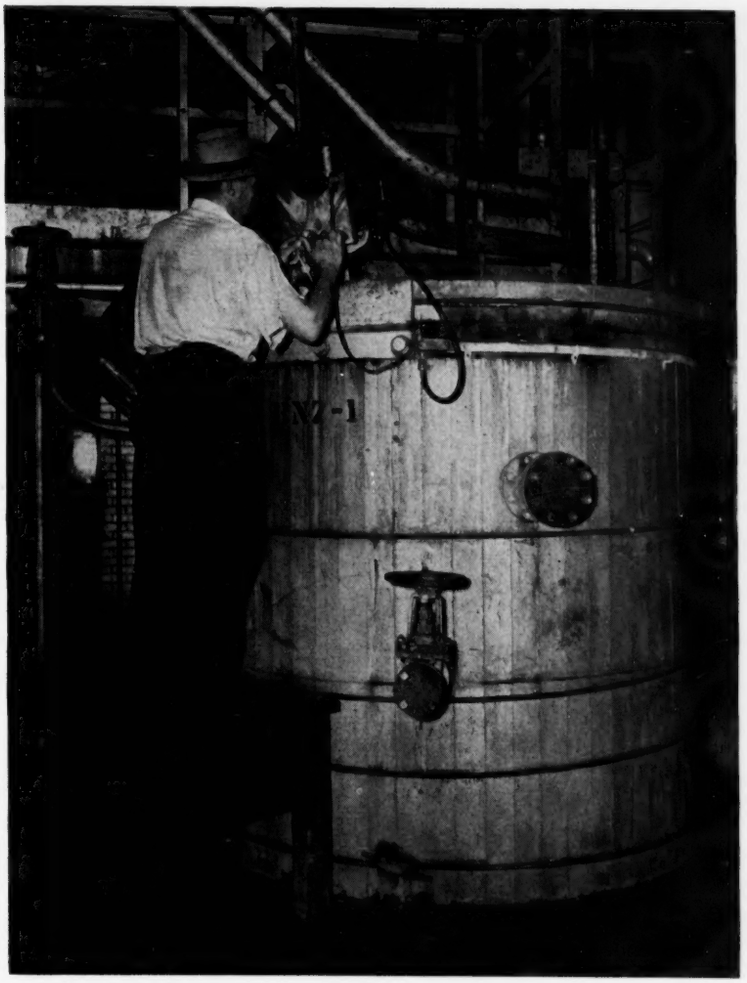
Synthetic Rubber

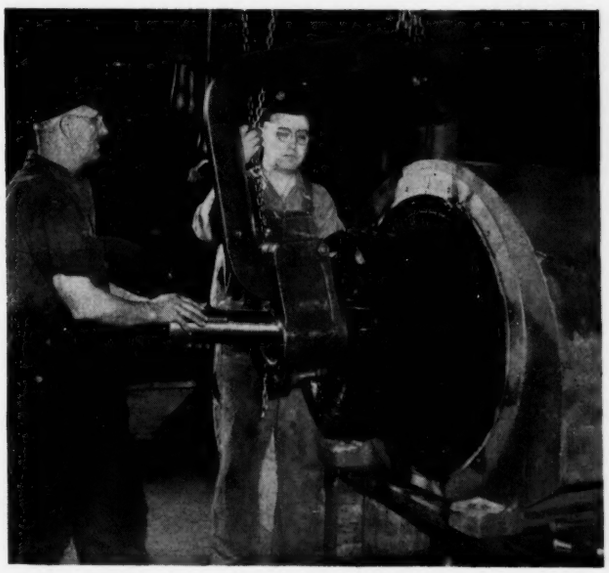
While the synthetic rubber program seems to be kicked around a good deal in Congress, government agencies and the daily press, progress is being made by the chemists and engineers in probably the biggest single chemical undertaking we have known.



In the vat at the right in one of the Standard Oil Company (New Jersey) plants, synthetic rubber in one stage of its manufacture is being agitated and stirred up to achieve the necessary degree of coagulation of the latex-like liquid which has resulted from the polymerization of butadiene and other chemicals. This is one of the important steps in converting these products from a petroleum by-product to synthetic rubbers of the Buna-S and Buna-N type.

Below, one of the four 500-horsepower motors now installed in the first plant to begin actual large-scale production of raw materials for the synthetic rubber program is shown being assembled at a General Electric plant just before shipment. Beginning this month the plant, operated by the Union Carbide and Carbon Co. in West Virginia, will produce butadiene, derived from alcohol as a raw material, and styrene, the principal ingredients of Buna-S rubber. In an adjacent plant operated by the United States Rubber Co. these materials are combined to form Buna-S.

Below, in a process resembling the formation of curds of sour milk, the rubber content of the latex of Ameripol, the B. F. Goodrich "Liberty Rubber" which can replace the natural product, is solidified by coagulation with dilute acids. The curds of solid Ameripol are then washed in large vats. Above, Dr. Waldo L. Semon, manager of B. F. Goodrich's synthetic research division, and discoverer of Ameripol, is shown stretching a particle of the rubber.



Headliners in the News

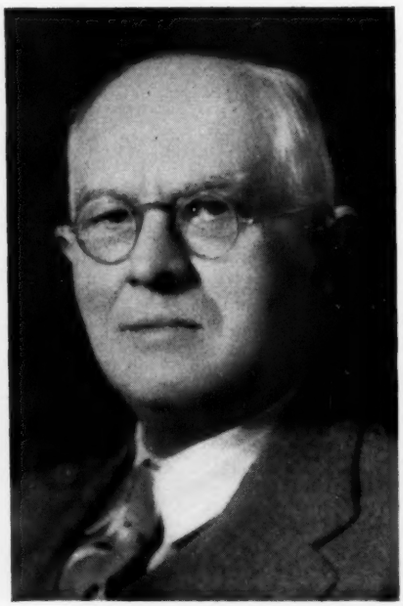
Left, Thomas R. Vaughan has been elected assistant secretary of Freeport Sulphur Company by the board of directors.

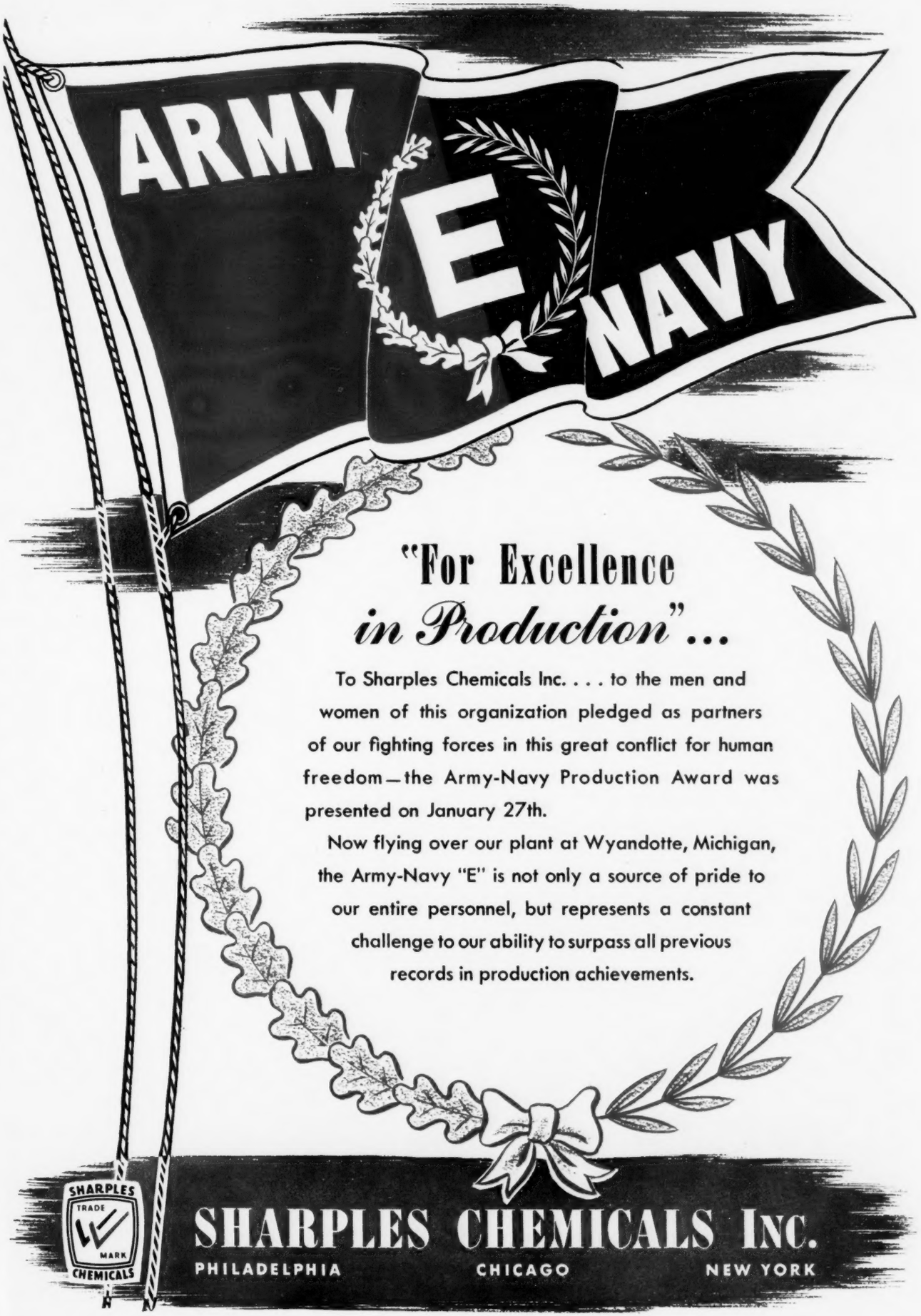
Mr. Vaughan was assistant counsel and later regional attorney for the National Recovery Administration. In addition to being elected assistant secretary of Freeport, Mr. Vaughan was elected to the same position with Cuban-American Manganese Corporation and Nicaro Nickel Company, Freeport subsidiaries.

Right, F. B. Lounsberry, vice-president in charge of manufacturing for all plants of the Allegheny Ludlum Steel Corporation, will henceforth make his headquarters at the company's general offices in Brackenridge, Pa.

Right, Sidney J. Steele, formerly executive vice-president of Continental Can Company, is now occupying a newly created position, vice-chairman of the board of directors.

Below, left to right. Harvey M. Merker of Parke, Davis and Company, general chairman of the 105th national meeting of the American Chemical Society, which, devoted entirely to the war effort, will be held in Detroit, April 12 to 16. William P. Putnam, founder and president of the Detroit Testing Laboratories, chosen honorary chairman of the "war meeting," and Dr. George Calingaert, director of the Detroit laboratories of Ethyl Corporation, vice-chairman of the meeting.





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To Sharples Chemicals Inc. . . . to the men and women of this organization pledged as partners of our fighting forces in this great conflict for human freedom—the Army-Navy Production Award was presented on January 27th.

Now flying over our plant at Wyandotte, Michigan, the Army-Navy "E" is not only a source of pride to our entire personnel, but represents a constant challenge to our ability to surpass all previous records in production achievements.

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SHARPLES CHEMICALS INC.

PHILADELPHIA CHICAGO NEW YORK

Interesting Shots from Here and There

Calco Receives "E"

On January 20, workers and management of the Calco Chemical Division, American Cyanamid Company at Bound Brook received the Army-Navy "E" Award for excellence in war production from General Alden H. Waitt, Chemical Warfare Service, Army of United States, and insignia pins for every employee from Commander Herman J. McCarthy, United States Navy, in a colorful ceremony.

The presentation, which was held in one of the plant buildings, featured fighting speeches by General Waitt and Commander McCarthy and a gracious address of acceptance by F. M. Fargo, Jr., General Manager, and Frank J. Pucci, President of the Chemical Workers Union Local.

Left to right, F. M. Fargo, Jr., General Manager at Calco; General Alden H. Waitt; Commander Herman J. McCarthy, and Frank J. Pucci.

Westinghouse Speeds Production

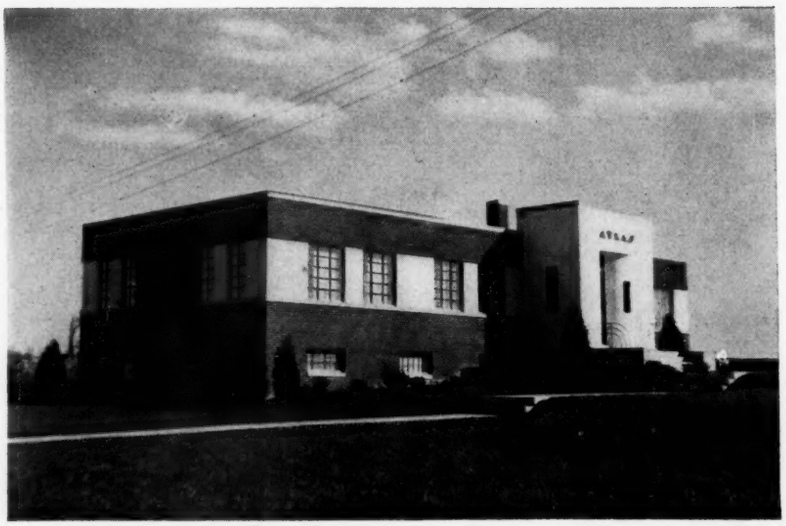
Left, Thirty-four employees of the Westinghouse Electric and Manufacturing Company were recently honored at the East Pittsburgh Works for ideas that helped to increase war production and save vital materials during 1942. Largest check in the history of the Westinghouse Suggestion System was presented to Production Clerk, Joseph Watson, shown here with a Navy-type circuit breaker. He was awarded $1,208.50 for suggesting the elimination of brushing and polishing two parts for such breakers.

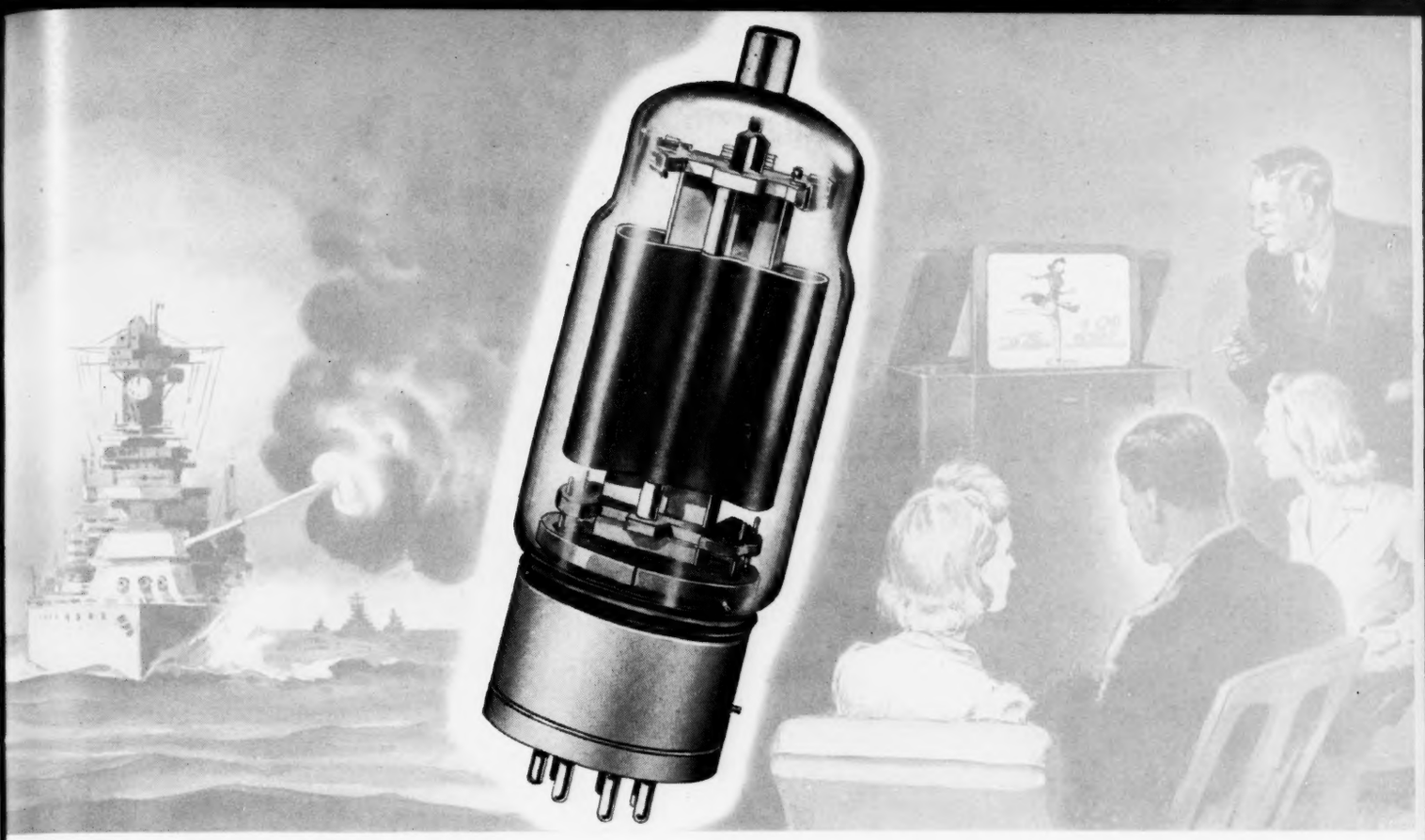
Right, War workers at the Westinghouse Electric and Manufacturing Company are smashing production records with the aid of music. Favorite recordings makes the work of girl employees flow smoothly at the East Pittsburgh Works where Westinghouse has installed record players and amplifying systems in five divisions manufacturing motors, safety switches and small circuit breakers.

Modern Administration Building

A name well known in the field of jointing compounds and acid-proof materials is that of The Atlas Mineral Products Company of Mertztown, Pennsylvania, whose modern, air-conditioned administration building is shown at the right.

This Company's original activities were the mining and grinding of dry earth paints and fillers. Founded in 1892 by the late Max F. Wirtz the company has expanded and added new products to form a well-rounded line of acid-proof cements and other corrosion-resistant materials of construction, widely employed in acid-proof units in steel and chemical plants and in other fields.





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Electronics—the new science of putting the electron to work!

Today, the electron tube guides the destinies of armies and fleets all over the world.

Tomorrow—this miracle-working tube which sees, hears, tastes, feels and smells with amazing sensitivity—will revolutionize our peace-time lives.

It will invade industry in all its aspects, save energy, save time, save money, protect life and property.

Baker is playing its part in contributing chemicals of extraordinary purity to make possible the coating of the filament used in the electron tube. Here, *purity is demanded*—so that transmission of electronic power may not be impeded.

This is only one of many instances where *purity*, as exemplified by Baker Chemicals, has increased efficiency in today's forward march of industry.

Baker's Chemicals (purity by the ton) have been supplied to many manufacturing concerns for the manufacture or processing of many products.

If you have special chemical requirements for war-production products, we invite you to discuss your needs in confidence with Baker.

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Low Alkali	not over 0.01%
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"IF I thought it would work, I'd take a closure off one of my drums of high octane gas.

"I'll tell you one thing, though — I wouldn't want that drum to travel as far as across the street minus one of those little sentinels. Especially nowadays.

"I know what I'm getting when I see a drum come in with Tri-Sure Closures doing guard duty on the lid. Those Tri-Sure seals are a swell sight to any man who has to count on getting every drop of oil, or gas, or chemicals he needs — and who has to be sure the stuff hasn't met up with sabotage or leakage or pilferage on the way.

"These days a drum without Tri-Sure Closures is about as complete as a safe without a lock. Ask any supply man. Ask any flyer. In fact, ask Uncle Sam!"

Tri-Sure

Reg. U. S. Pat. Off.

CLOSURES

AMERICAN FLANGE & MANUFACTURING CO. INC., 30 ROCKEFELLER PLAZA, NEW YORK

Tri-Sure News

NUMBER 2 ★ 30 ROCKEFELLER PLAZA, NEW YORK, NEW YORK ★ FEBRUARY, 1943

ZINC

The Report of the Division of Information of the War Production Board gives the highlights on the question of zinc supplies both for the past and the future.

For the benefit of those who have not seen it before, we reprint the text of the Report hereunder.

Shortages of zinc were anticipated two years ago, and conservation measures were taken in the early days of the national defense program to bring supply into balance with demand. It was not until mid-1942 that zinc again became critical.

After trimming non-essential use to a minimum, two problems — developing new sources of ore and expanding milling, smelting and refining capacity—had to be solved.

Forty-eight projects recommended by the Zinc Division of WPB were put into construction. These projects include development and exploitation of new ore deposits, opening of new mines, mills, smelters and refineries. One new smelter was completed in 1942, and four electrolytic refineries with an annual capacity of 216,000 tons were put into operation.

To encourage production of marginal ores, premium prices of 2¾ cents a pound over regular prices is paid for all production over quota. Government aid in the form of technical and engineering assistance, loans, help in building access roads and attempts to correct the labor shortage was made available to zinc producers.

WPB made arrangement with the Board of Economic Warfare to step up imports of South American and Canadian ores and concentrates. Progress was made in increasing amounts of recoverable metal in Canadian concentrates.

The central problem in zinc supply at this time is continuing supply of ores. Ore deposits are limited, and the possibility of opening new mines of substantial size is small. Labor shortages in zinc mines, similar in all respects to those in copper mines, are the biggest threat to continued full production.

The U. S. faces the second year of war with uncertainty as to the adequacy of its future zinc supply.

BUREAU OF EXPLOSIVES

ASSOCIATION OF AMERICAN RAILROADS
OFFICE OF CHIEF INSPECTOR
30 VESEY STREET
NEW YORK, N. Y.

FILE NUMBER 277-1

W. S. TOPPING, CHIEF INSPECTOR
H. A. CAMPBELL, ASST. CHIEF INSPECTOR

Dec. 19, 1942

American Flange & Manufacturing Co., Inc.,
30 Rockefeller Plaza, New York City

Gentlemen:

With reference to the regulations and specifications as prescribed by the Interstate Commerce Commission, which became effective on January 7, 1941, and with particular reference to specification 5 covering the construction of metal barrels and drums, paragraph 9 (c) of specification 5 originally called for 5 thread engagement between the plug or cap and the flange. By an amendment to the aforesaid specifications, approved on September 20, 1941 (mandatorily effective February 1, 1942), paragraph 9 (c) was superseded and amended to read as follows:

"9. (c) For closure with threaded plug or cap, the seat (flange, etc,) for plug, or cap, must have 3 or more complete threads; two drainage holes of not over 5/16 inch diameter are allowed. Plug, or cap, must have sufficient length of thread to engage 3 threads when screwed home with gasket in place."

I, therefore, advise you that under the authority of paragraph 9 (c), I. C. C. Specification 5, which is amended as given in the above quotation which supersedes and replaces the previous paragraph 9 (c), your Tri-Sure closure complies with the regulations and the use of it for such containers is fully authorized.

Yours truly,

W. S. Topping
Chief Inspector

This letter from the Bureau of Explosives is self-explanatory

Empty Containers Rule Revised by BEW

Board of Economic Warfare has revised the classification on the return of empty containers. The board has ruled that bags and containers, including metal drums and gas cylinders, used in shipping articles and materials to this country from Group K countries may be exported under General License when returned empty.

Steel Barrel Output Off

Production of heavy steel barrels and drums in November, 1942, was 1,387,527, compared with 1,497,688 for October, 1942, and 1,585,523 for November, 1941, according to the Bureau of Census. Shipments were 1,385,721 for November, 1942, as against 1,504,324 for October, 1942, and 1,603,788 for November, 1941. Stocks at the end of the month totaled 48,604. Output of light type barrels and drums in November, 1942, reached 325,324, compared with 288,894 last year.

AMERICAN FLANGE & MANUFACTURING COMPANY INCORPORATED
TRI-SURE PRODUCTS LIMITED, ST. CATHARINES, ONTARIO, CANADA

NEWS OF THE MONTH

Taylor Appointed Editor of Chemical Industries

WITH this issue of CHEMICAL INDUSTRIES, the very pleasant association I have so thoroughly enjoyed for nearly 14 years comes to a close. Ours has been a very loyal and happy family. The expression "One for all and all for one" may sound somewhat trite, but it does aptly describe the intimate relationship of the staff of this publication.

I have accepted the offer of the Board of Directors of the American Chemical Society to succeed to the position held by the late Dr. Harrison E. Howe—editor of *Industrial & Engineering Chemistry, Chemical Engineering News*, and director of the A. C. S. News Service. I believe it was my duty to accept the offer of the Board of Directors of the Society and I am delighted to say that the publishers of CHEMICAL INDUSTRIES viewed my decision in the same light.

Particularly gratifying to me is the selection of Robert L. Taylor as your next editor. "Bob" has been a very intimate friend of mine for many years and I know from several years' observation that he is exceptionally well qualified to fill the position as editor of CHEMICAL INDUSTRIES.

Mr. Taylor comes to this publication after a brilliant period of service with the Monsanto Chemical Company.

A graduate of the University of Michigan, B.S., in Ch.E., he was a research assistant in metallurgical chemistry and is the life-time secretary of his alumni. Mr. Taylor is the author of the Chemical Industry's section of the book entitled "Development of American Industry," published by Prentice Hall, New York, and assisted Dr. E. H. Hempel in his preparation of the book "Economics of Chemical Industry," published by John Wiley & Son, New York.

Mr. Taylor was formerly with the Sharples Chemicals, Inc., Wyandotte, Mich., which he left in 1936 to become an associate editor with the publication *Chemical & Metallurgical Engineering*. He became associated in 1938 with the Monsanto Chemical Company, St. Louis, Mo., as Divisional Advertising Manager of Organic Chemicals and Merrimac Divisions. He was responsible for advertising in Canada, South America and the Orient, as well as publicity in domestic business journals and miscellaneous advertising for the four chemical divisions of the company. He recently assumed responsibility for the Plastics Division advertising and national institutional advertising as a war-time expedient. His work with Monsanto has involved the writing of many technical articles and assisting on the editorial boards of Monsanto Magazine and Monsanto News.

His experience embraces both a wide and thorough knowledge of the chemical industry and an appreciation of the marketing and merchandising problems of the industry.

Mr. Taylor is a member of the American Institute of Chemical Engineers and served several terms as Chairman of the Public Relations Committee. He is also a member of the American Chemical Society.

He was the first President of the Junior Chemical Engineers of New York and was instrumental in formulating many of their present policies. He is also National Chairman of Engineering College Magazines Associated. Mr. Taylor's engineering, journalistic, marketing and merchandising as well as business training has earned him well merited recognition by the chemical industry for his efforts in its behalf.

I am supremely confident that Mr. Taylor will merit and will receive the same degree of cooperation and help from the members of the staff of CHEMICAL INDUSTRIES, the Consulting Editorial Board, and the industry that I have enjoyed and cherished. I congratulate him most heartily on his well-deserved promotion and wish for him outstanding success in his new position of great responsibility. His integrity, ability and record of past achievements are definite assurance that he will continue to maintain the high ideals and splendid journalistic traditions that have guided the editorial policies of this publication since its inception more than a quarter of a century ago.

I salute a new collaborator!

Walter J. Murphy

Robert L. Taylor

GENERAL

Reid Advances in WPB

War Production Board has announced the appointment of Dr. Ernest W. Reid as Deputy Director General of Industry Divisions, succeeding Curtis E. Calder, who has been named Director General for Operations. Dr. Reid was, until his promotion, Mr. Calder's assistant. He came to Washington in June, 1940, as a member of the Advisory Commission to the Council on National Defense, and was appointed chief of the Chemicals Branch in Feb. 1942.

Dr. Reid was later named Director of the Commodities Bureau, one of the five operating bureaus created in November of that year to co-ordinate the activities of related WPB industry divisions. The operations of the Chemicals, Printing and Publishing, Pulp and Paper, Cork and Asbestos, and Containers Divisions were also supervised by Dr. Reid.

ACS to Meet in Detroit

The 105th national meeting of the American Chemical Society, to be devoted exclusively to the advances of Chemical Science and industry in relation to the war effort, will be held in Detroit, April 12 to 16 Ten "war symposia" are scheduled. Fifteen divisions of chemical science will convene, with 4,000 chemists and allied scientists attending. All plant trips and entertainment will be omitted.

William P. Putnam, founder and president of the Detroit Testing Laboratories, has been named honorary chairman of the

meeting. Harvey M. Merker, superintendent of manufacturing of Parke, Davis and Company and president of the Engineering Society of Detroit, is general chairman. Vice chairman is Dr. George Calingaert, director of chemical research for Ethyl Corporation (see page 220 for pictures).

Special symposia will bear directly on the successful prosecution of the war. The Division of Agriculture and Food Chemistry will hear reports on substitutes for agricultural and food commodities of which there are inadequate supplies to meet current demands. It will also hold a session on stabilization of fats, a matter of importance in food for the armed forces.

Recognizing the increasing scarcity of certain high-protein foods, the Division of Biological Chemistry together with the Agricultural and Food Division will sponsor a program on vegetable proteins. The two divisions will also hold meetings on vitamins and on assay methods for determination of vitamins, now incorporated in foods by federal regulations.

Outstanding authorities will discuss the chemical aspects of civilian defense at a meeting of the Division of Chemical Education. "Malaria" will be the subject of the Division of Medicinal Chemistry. The paramount importance of the health of troops and civilian population and the shortage of quinine make this symposium vital, it is pointed out.

Recent developments in synthetic rubber technology, accelerated by the war, will be dealt with by the Division of Rubber Chemistry. Solvents, occupying an essential place in war industry, will be discussed by the Division of Industrial and Engineering Chemistry. Since industry cannot function without large quantities of suitable water, industrial water supplies will be the topic of a symposium of the Water, Sewage, and Sanitation Chemistry in collaboration with the Industrial Division.

Petroleum chemists will devote themselves to analytical methods. Other divisions meeting include organic, physical and inorganic, cellulose, colloid, gas and fuel, analytical and micro chemistry and sugar chemistry and technology.

The Society will hold a general session, at which the president, Dr. Per K. Frolich, director of the Chemical Division of the Esso Laboratories of the Standard Oil Development Company, Elizabeth, N. J., will preside, on Wednesday afternoon. Among those attending will be Dr. Thomas Midgley of Worthington, Ohio, vice president of Ethyl Corporation and president-elect of the Society. A council meeting at which Dr. Charles L. Parsons of Washington, D. C., secretary and general manager of the Society, will report, will take place Wednesday morning. A general dinner will be given on Wednesday evening.

Safety Campaign

National Safety Council has begun a special accident prevention campaign to Save Manpower for Warpower, a campaign undertaken at the direction of President Roosevelt. As its first goal the Council offers a series of authoritative manuscripts—discussion, opinion, and judgment by recognized leaders in the field of accident prevention in industry—to solve accident problems which right now are causing serious trouble in many industries.

Officials of chemical companies will be interested in the extensive list published by National Safety Council, 20 North Wacker Drive, Chicago, Ill. The names of a few of these speeches follow:

The Production Value of a Well Rounded Accident Prevention Program—H. L. Cox, Carbide and Chemicals; *The Use of Conductive Flooring and Materials for the Elimination of Static Electricity*—E. J. Meyers, du Pont; *Demonstration and Discussion of Various Respiratory Protective Equipment*—H. H. Schrenk, U. S. Bureau of Mines; *Safe Use of Substitute Solvents and Chemicals*—J. H. Sterner, Eastman Kodak; *Occupational Disease Factors*—Lemuel C. McGee, Hercules Powder; *The Effect of Lengthened Hours on Safety Problems in the Rubber Industry. Male and Female Employees*—Lucy O. Norton, General Electric Co.

Rubber Plants Tested

Nearly 2,000 varieties of plants found in this hemisphere have been tested for rubber since March, 1942, by investigators of the department of agriculture at Cornell University working with the B. F. Goodrich Co. which financed the project. A new quick five minute process to indicate approximately how much rubber and resins plants contain has been developed by the university researchers.

The Russian dandelion appears to be the most promising emergency rubber-bearing plant for growth in the North. The rubber content of this plant can be extracted mechanically and then the roots may be used for alcohol production. In normal times the yield from this variety of dandelion would hardly pay the cost of production.

COMPANIES

Hercules Sets Up Physics Group

To meet the growing importance of physics in industrial research, the central chemical laboratories of Hercules Powder Company have established a separate technical group to coordinate and develop physics work. Research by the new physics group under the direction of Dr. Willard P. Connor, Jr., will emphasize electronics and optics, using such equipment as the electron microscope, mass spectograph, x-ray defraction cameras for crystal structure analysis, and spectographs for a complete range of light absorption studies.

Butadiene Plants Operating

The first of the butadiene plants which are to produce raw material from petroleum for the government's synthetic rubber program began operations Jan. 29 at Baton Rouge, La. Planned by Standard Oil of Louisiana, subsidiary of Standard Oil Co. (N. J.), the plant has a rated capacity of 6,600 to 9,000 tons of butadiene per year depending upon the quality of the petroleum fractions used as feed stock in the plant. This is enough butadiene to produce rubber for 1,300,000 to 2,000,000 tires. It is the largest plant yet put in operation for making synthetic rubber raw materials.

Three additional butadiene units at Baton Rouge which are being wholly or partly financed by the government are well along toward completion, and will be coming into production successively during the next three months.

Diakel to Operate Plant

Diakel Corp., Cincinnati, O., and Defense Plant Corp. have contracted to provide plant facilities adjacent to the present plant of Diamond Alkali Co., Standard Silicate Division. Estimated cost of the plant is in excess of $2,000,000. Diakel, which is owned jointly by Diamond Alkali Co. and M. W. Kellogg Co., will operate the plant; title will remain in Defense Plant Corporation.

General Aniline Opens Lab

Operation of General Aniline & Film Corporation's new research laboratory at Easton, Pennsylvania, started recently.

A staff of fifty technologists, (chemists, physicists, and chemical engineers) later to be increased in number, will be directed by Dr. E. C. Williams, Chemical Director and Vice-President of the Corporation, and formerly head of the Shell research laboratory at Emeryville, California.

The present research program will be devoted to dyestuffs chemistry, but is expected to extend into broader fields of chemical industry.

Koppers Completes Plant

Completion of a portion of the first metallurgical coke plant on the West coast has been announced by Koppers Co., Engineering and Construction Division. Plant is made up of two batteries totaling 90 Koppers-Becker Coke Ovens of the latest design and contains equipment for recovery of by-products—tar, ammonium sulfate, benzol, toluol, xylol, solvent naphtha and phenols, including the extraction of phenol from waste liquors. Built in

the San Bernardino Valley for the Henry J. Kaiser Co., Inc., the ovens will furnish more than 900 tons of coke daily for the blast furnace of a steel mill on the West coast.

Essential Oil Film

Dr. Ernest Guenther, chief research chemist of Fritzsche Brothers, Inc., presented the latest in his series of colored motion pictures featuring "Essential Oils and Their Production in the Western Hemisphere" on Jan. 25 and 28 at the Hotel New Yorker. The films and accompanying talk by Dr. Guenther covered his most recent surveys of West Indian, Mexican, Central and South American essential oil production and attempted to show the progress now being made by Western Hemisphere producers in supplying our increasing needs of essential oils.

History of Iodine

A brief history of iodine, its principal uses and sources, and its importance in diet and in the field of medicine are outlined in the Feb. number of *Priorities*, house magazine of Prior Chemical Corp.

U. S. I. to Erect Alcohol Plant

U. S. Industrial Chemicals, Inc., acting for the Defense Plant Corp., will erect an additional alcohol distilling plant at Ludlow, N. Y. Estimated costs for the expansion are put at $55,000.

Van-Karen at Port Jervis

Van-Karen Chemical Co. of N. Y. City has leased the Finan Bldg., Port Jervis, N. Y. At the present time the firm specializes in the manufacture of signal flares.

Monsanto Styrene Contract

Defense Plant Corp. has authorized a $2,000,000 increase in a $13,000,000 contract with Monsanto for additional facilities at the company's synthetic rubber plant in Texas. The plant is designed to manufacture styrene by a process developed in Monsanto's research laboratories.

ARMY-NAVY "E" AWARDS

Rohm & Haas

The Bristol, Pa. plant of Rohm & Haas Co., whose research laboratories perfected the highly-transparent plastic, Plexiglas, used for turrets, cockpit-covers and noses of U. S. warplanes, received the joint Army-Navy "E" Pennant Jan. 29 for its excellent production record. The presentation rally, at which Dr. Thomas S. Gates, president of the University of Pennsylvania, acted as master of ceremonies, included a presentation of the "E" pennant by Brig. Gen. F. O. Carroll of Wright Field, and distribution of the "E" pins to Rohm & Haas workers by Lt. Comm. O. R. Sutherland of the Philadelphia Navy Yard.

Eli Lilly

Eli Lilly & Co. and its employees received the Army-Navy "E" Jan. 27 from Brigadier General L. B. McAfee, acting surgeon general, for excellence in production of pharmaceutical and biological products, the sulfa drugs and the processing of blood plasma.

Joshua Hendy

The Joshua Hendy Iron Works, Sunnyvale, Calif., has acquired the Pomona Pump Co., its subsidiary Westco Division, and the Crocker-Wheeler Electric Mfg. Co. The parent company, which flies the Maritime "M" and the Army-Navy "E" flags, manufactures marine engines, steam turbines, turbo-generators, motors, pumps, and other equipment.

Westinghouse

Brigadier General A. G. Gillespie, recently awarded the Army-Navy "E" pennant for excellence in war production to the East Springfield, Mass. plant of the Westinghouse Electric & Mfg. Co. This is the eighth such award to be won by the Westinghouse Co. Formerly devoted to the production of refrigerators, vacuum cleaners and other electrical appliances, the East Springfield plant now is engaged in manufacture of equipment for tanks, airplanes, anti-aircraft guns, combat and cargo vessels and refrigeration apparatus for war-essential industrial processes.

Ciba

The Army-Navy Production Award has been conferred on Ciba Pharmaceutical Products, Inc., for outstanding accomplishment and excellence in production of vitally needed war materials.

Babcock and Wilcox

The Army-Navy "E" award was presented to the Refractories Division, Augusta Works, of the Babcock and Wilcox Company for its "tremendous strides in war production in recent months" at a ceremony held on Jan. 22. It is the first such distinction recommended by the Navy Dept. and bestowed on an industrial plant in Georgia.

Barrett

The Army-Navy "E" for excellence in chemical production was awarded to the Frankford plant of the Barrett Division, Allied Chemical & Dye Corp., in a ceremony held at the plant, Feb. 5.

Sharples

Sharples Chemicals, Inc., Wyandotte, Mich., has received the Army and Navy Production award for its excellent record in producing war equipment. Lt. Colonel Wm. O. Brooks, C. W. S., U. S. Army, presented the award at the colorful ceremonies held Jan. 27.

Merck

An Army-Navy "E" was awarded to the men and women of the Rahway Plant, Merck & Co., Inc., on Feb. 9. Major General James C. Magee, Surgeon General of U. S. Army presented the flag, Gov. Charles Edison of N. J. was the guest speaker, and Mayor David Armstrong of Rahway welcomed the employees and their guests to the presentation ceremonies.

ASSOCIATIONS

LoBue President of Salesmen

Phil J. LoBue, Eastern representative, Michigan Chemical Co., was installed as president of the Salesmen's Assoc. of the American Chemical Industry at a meeting held in the Chemists' Club, Jan. 21. Following the resignation of Gerald S. Furman, Merck & Co., who had been elected by mail but was unable to serve because of new wartime duties, Mr. LoBue was appointed president by the executive committee. Other officers named by the executive committee were:—Vice-president, Frank Fanning, Malstrom & Co.; treasurer, Charles Alexander, L. Sonneborn Sons, Inc.; and secretary, James McInnes, Commercial Solvents Corp. John A. Chew and Edward S. Burke were elected to the executive committee.

Chlorine Institute Elects

The Chlorine Institute, Inc., held its annual and directors' meetings Jan. 27 at the Chemists' Club, N. Y. City. The following directors were elected for two years:

Thomas Coyle, du Pont, Electrochemicals Dept.; W. I. Galliher, Pittsburgh Plate Glass Co., Columbia Chem. Div.; L. Neuberg, Westvaco Chlorine Products Corp.; E. E. Routh, Mathieson Alkali Works; B. P. Steele, Pennsylvania Salt Mfg. Co.; Eli Winkler, Southern Alkali Corp.

The hold-over directors are:

G. S. Cooper, Diamond Alkali Co.; R. W. Hooker, Hooker Electrochemical Co.; S. W. Jacobs, Niagara Alkali Co.; E. C. Speiden, Isco Chemical Division, Innis, Speiden & Co.; I. H. Taylor, Wyandotte Chemical Co.

At a directors' meeting following the annual meeting, the officers shown below were elected for the year 1943:

S. W. Jacobs, president; E. C. Speiden, vice-president; Robert T. Baldwin, secretary and treasurer.

ASTM Tables

The new tables of data on chemical compositions, physical and mechanical properties of wrought corrosion-resisting and heat-resisting chromium and chromium nickel steels published in Dec. 1942, by the American Society for Testing Materials were developed by Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel and Related Alloys. A number of manufacturers and users of stainless steel contributed the data and Messrs. Franks and LaQue carried out the work of the committee.

The data is given in condensed form and covers material in widest commercial usage. Wrought chromium steels, 4 to 6%, 8 to 10% chromium, etc., are detailed in the first part, while the second covers wrought chromium-nickel steels up to 25% chromium, 20% nickel. All told there are twenty-one extensive but compact tables and twenty-six charts and curves covering chemical composition, physical properties, forging and heat treating practices, mechanical properties of steels, creep characteristics, and short-time tensile properties. This is the third publication in the series on stainless steels issued through the work of the society; the first two appeared in 1924 and 1930.

Copies of the 44-page pamphlet may be obtained from A.S.T.M., 260 S. Broad St., Phila., Pa., at $1.25 per copy.

Plan Drug, Chemical Dinner

More than 100 members of the Publicity and Reception Dinner Committees of the Drug, Chemical and Allied Trades Section of the New York Board of Trade met Jan. 27 at The Waldorf-Astoria to plan for the 18th annual dinner of the organization to be held at the same hotel on Thursday, March 4.

Charles C. Caruso, of Schieffelin & Company and Chairman of the Reception Committee, announced that the United Seamen's Service, Inc., had been selected to benefit from the dinner. This world wide organization is dedicated to the rehabilitation of United Nations sailors during their brief periods of shore leave.

SCI, AIChE Joint Meeting

Joint meeting of American Section of the Society of Chemical Industry and the Am. Institute of Chemical Engineers will be held on Feb. 19 in the Commodore Hotel, N. Y. City. Dr. Foster D. Snell will preside at the session which will be devoted to "Foods in War and Peace." "Quick Frozen Foods" will be discussed by E. T. Gibson, president of Frosted Foods Sales Corp. and "Dehydrated Foods" by R. S. Hollingshead, assistant chief, Agricultural Chemical Research Division, U. S. Dept. of Agriculture. Dinner will be served prior to the meeting.

SCI Nominates Cohoe

Wallace P. Cohoe, consulting chemist of N. Y. City, has accepted nomination for the presidency of the Society of Chemical Industry, international professional organization with headquarters in London, England. Election of officers will take place in England in July, 1943. Dr. Cohoe is a member of American Chemical Soc., American Institute of Chemical Engineers, Fellow American Institute of Chemists, and Fellow American Assoc. for the Advancement of Science.

Color Card Association

John F. Warner, director of development of Calco Chemical Division, Am. Cyanamid Co., was appointed to the board of directors of The Textile Color Card Assoc. by its president, Charles Pinnell, to fill the vacancy caused by the death of William Hand.

Cereal Chemists Hear Coghill

The largest attendance of the year at the Midwest Section of the American Association of Cereal Chemists turned out Jan. 11 to hear Dr. Robert D. Coghill, Chief, Fermentation Division, Northern Regional Research Laboratory, U. S. Dept. of Agriculture, Peoria, Ill. Dr. Coghill spoke on fermentation in farm product utilization. About 65 cereal and brewing chemists were present.

Bogin on Plasticizers

Charles W. Bogin, Research Department of Commercial Solvents Corp., spoke on "Plasticizers" at the 226th meeting of the Cincinnati, Dayton, Indianapolis, Columbus Paint and Varnish Production Club held Dec. 14, at the Cincinnati Club, Cincinnati, O. The speaker classified the effects and properties of plasticizers and discussed their characteristics.

Paint Problems Discussed

Louisville Paint and Varnish Production Club held its January meeting in the Brown Hotel, Louisville, Ky., on the 21st. Mr. D. W. Robertson of the Titanium Pigment Corp., guest speaker, discussed "Substitutions and Adjustments in Paint Formulation to Meet Present War Restrictions."

Egloff Addresses AMA

Speaking before the Wartime Marketing Conference of the American Management Association at Drake Hotel, Chicago, Dr. Gustav Egloff, director of research of Universal Oil Products Co. and president of Am. Institute of Chemists, predicted that vast peacetime values emerging from war technology will revolutionize our way of life, with the U. S. assuming world leadership in research. Man's life will be prolonged, his health, mentality, imagination and productivity increased, and the pain and irritations of life will be reduced to a minimum, he stated.

Textile Chemists' Plans

Piedmont section of Am. Assoc. of Textile Chemists and Colorists will hold only three meetings this year. The first will be in Greenville, S. C., early in March. Second will be held in Greensboro during May or June. Fall meeting is scheduled for October in Charlotte. Exact dates will be announced later.

Camouflage Finishes Discussed

Cincinnati, Dayton, Indianapolis, Columbus Paint & Varnish Production Club's January meeting was held at Deshler-Wallick Hotel, Columbus. Speaker of the evening was Fred Jones, in charge of finishing, Columbus plant, Curtiss-Wright Corp., who discussed camouflage finishes.

Fire-Proof Painting for Ships

Golden Gate Paint and Varnish Production Club met at El Jardin Restaurant, San Francisco, Dec. 28. Main discussion of the evening centered around fireproof painting for the interior of ships, one of the problems confronting the Mare Island Navy Yard.

Perry Addresses Paint Club

Mr. Perry, Resinous Products & Chemical Co., addressed the Cincinnati, Dayton, Indianapolis, Columbus Paint & Varnish Production Club on "Plywood for War" at its February meeting in the Van Cleve Hotel, Dayton, O. Particularly emphasizing the advances in plywood technique, the guest speaker demonstrated the manufacture of resin bonded plywood by the hot press method.

BIMS Annual Dinner

Buyers, Importers, Manufacturers Salesmen of N. Y. held their annual dinner at Hotel Lafayette, Jan. 21, with 140 members and guests attending. In addition to five victory bonds given away as door prizes, 26 bonds were distributed by the BIMS in a series of sweepstake drawings.

Bunn Speaks on Plastics

New York Section of the American Institute of Chemical Engineers and the American Section of the Society of Chemical Industry met jointly on January 28th at The Chemists' Club. Guest speaker, H. S. Bunn, Manager of Plastics Division of Carbide and Carbon, discussed "The Effect of War on Plastic Materials and Their Possible Post-War Applications."

AIChE Hears Cramer

Guest speaker at the dinner meeting of N. Y. Section of American Institute of Chemists on Jan. 29 at the Chemists' Club was Dr. Howard I. Cramer. In his address on "Synthetic Rubber," Dr.

Cramer outlined the task facing the country in undertaking to create, within two years, a production capacity for synthetic rubber-like materials that will be almost double our average normal requirements for natural rubber.

Harris Talks to Cereal Chemists

The practical application of interface modifiers to the problems of manufacturing foods, such as leavening agents, flour, starch, sugar, malt, beer, yeast, dehydrated eggs, milk, salt, shortening, and all types of bakery products, was discussed by Benjamin R. Harris at the Feb. 1 meeting of the Midwest Section of the American Assn. of Cereal Chemists. Mr. Harris, vice-president of the Emulsol Corp., demonstrated also a number of interface phenomena of interest to cereal, malting, and brewing chemists.

PERSONNEL

Slawter in Air Corps

The latest contribution of the CHEMICAL INDUSTRIES' staff to Uncle Sam's Army is Paul B. Slawter, Jr., Associate Editor. Mr. Slawter volunteered for the Army Air Corps in the fall of 1942 and was called into active service January 29. At present he is located in Atlantic City but after short preliminary training there he will be sent to a pre-flight school.

Paul attended Alfred University School of Ceramic Engineering but later turned to the newspaper field. From 1937 to 1939 he published three weekly tabloids on Long Island. He then joined the staff of *Tires* as associate editor.

In March, 1941, he came to CHEMICAL INDUSTRIES as assistant editor and advanced to the posts of associate and market editor where his distinct style and keen analyses of trends brought him a large following among C. I.'s readers.

Johnson Heads Small War Plants

Col. Robert Johnson, president and board chairman of Johnson and Johnson, manufacturers of pharmaceutical dressings, has been placed in charge of the government's Smaller War Plants Corp. He also was named vice-president of the War Production Board. As chairman of SWPC, Col. Johnson will replace Lou E. Holland of Kansas City, who has directed the agency since July.

Chairman of Schering

William J. Hagenah of Chicago, has accepted the chairmanship of the Schering Corp. of Bloomfield, it was announced by Leo V. Crowley, Alien Property Custodian at Washington, D. C.

Mr. Hagenah has been president of the Public Utilities Engineering and Service Corp. since 1938 and resigned on Jan. 1 to take over the Schering position. He was graduated from the University of Wisconsin and was formerly a member of a Chicago law firm. Hagenah has shared in the writing of utilities regulatory laws of several states.

Pittsburgh Plate Glass Appoints

Dr. Alphonse Pechukas has been appointed research director of the Columbia Chemical Div., Pittsburgh Plate Glass Co. Dr. Franklin Strain has been named assistant research director.

Dr. Pechukas, who has been serving as acting director since May, 1942, first entered the company's chemical division in 1937 as a laboratory research worker. Born and educated in Chicago, he received the B.S. degree from the Univ. of Chicago in 1934 and Ph.D. in 1937. He is a member of the American Chemical Soc. and the American Assn. for the Advancement of Science. Dr. Pechukas is only 28 years old, and hence has the distinction of being among the youngest directors of research in the industrial field.

Dr. Strain received the Ph.D. degree in organic chemistry from the Univ. of Kansas in 1933, and became graduate instructor there. He was later research chemist for Luzier's, Inc., and for Behr-Manning Corp., before going to the Pittsburgh Plate Glass Co. in 1937. He also is a member of the American Chemical Soc.

Dr. C. L. Mantell, consulting engineer, spoke to the graduate seminar of Syracuse University, Jan. 25, on the subject of power for the chemical industries; in the evening he discussed powder metallurgy at the Technology Club, Syracuse, N. Y.

Dr. Donald K. Tressler, head of Chemistry Division at N. Y. State Experiment Station, Geneva, since 1933, has joined the research staff of General Electric Co. in Bridgeport, Conn., to work with refrigeration and quick freezing.

Lawrence A. Appley, vice-president of Vick Chemical Company, has been appointed executive director of the War Manpower Commission with complete administrative authority over all phases of the staff services, planning, and operations.

Robert E. Horsey has joined the sales staff of Givaudan-Delawanna, Inc., in the New Products division.

Herman M. Schulman will head the chemical sales dept. of Washine National Sands, Inc.

Dr. R. C. Houtz, research chemist, Du Pont Co. rayon department, Buffalo, and gas identification officer for Erie County, N. Y., was graduated from the advanced gas specialists' school sponsored by Office of Civilian Defense at Amherst College.

M. J. Sostmann, formerly with Sinclair Refining Co., has joined the staff of Philadelphia Textile Finishers, Inc., as research chemist.

Harry E. Dunning, formerly vice-president and general manager of American Distilling Co., has been appointed general sales manager of DeMert & Dougherty, Inc., Chicago, marketers and distributors of industrial alcohol and solvents.

Jonas R. Moore, former associate of the General Chemical Co., has been appointed to the research staff of Battelle Memorial Institute, Division of Chemical Research.

E. F. Drew, president of E. F. Drew & Co., Inc., N. Y. City, announces the appointment of **Robert Bruce** as advertising and publicity manager.

W. G. Paton, of Cleveland, and **W. E. Engstrom,** of Seattle, have been appointed vice-presidents of The Austin Company according to an announcement by **George A. Bryant,** president and general manager.

Captain Nelson W. Pickering, USNR, ordered to report for active duty in the United States Navy, has resigned as president of Farrel-Birmingham Company, Inc.

Hoy O. McIntire has joined the research staff of Battelle Memorial Institute, Columbus, O., where he will be engaged in metallurgical research and development.

K. T. Price, in charge of production at the Freeport Sulphur Company's Grande Ecaille mine in Plaquemines parish since it began operation in 1933, has been made general superintendent of the mine.

Atlas Powder Co. announces the appointments of **Frank J. Horty** to director of the new Service Dept. and **John Swenehart** to director of the newly formed Advertising and Public Relations Dept.

James R. Hewitt has been appointed vice-president of American Manganese Steel Division, American Brake Shoe and Foundry Co.

Gould Grant Rheuby retired from his positions as vice-president, director, and member of the finance committee of Hercules Powder Company on Jan. 27. He had served the company since April 1, 1913, only three months after it had commenced business. **Charles A. Bigelow,** who is also a vice-president, has been elected to succeed Judge Rheuby on the finance committee.

Theodore G. Sullivan, who has been closely associated with the rubber industry since 1918, has joined the staff of Foster D. Snell, Inc. As research director of the recently expanded Rubber and Plastic department, Mr. Sullivan will directly supervise all problems in the field.

Other recent additions to the staff of Foster D. Snell, Inc., include **Irene Lettire,** B.A., recent Hunter College graduate, assigned to development work; **Isidor Sherer,** B.S., College of the City of New York, working in the analytical department; **Bernice Gitler,** B.A., New York University, formerly medical technician at Beth-El Hospital, now assistant in the Bacteriological Department, and **Anna Ludutsky,** B.S., Queens College, formerly with Mallinckrodt Chemical Company.

John W. Hassler, chemist and head of the Chemical Sales Co., has been appointed to serve as an industrial and research development chemist for the referee board of the chemical branch, Office of Production Research and Development, War Production Board. Hassler's new work will be handled by correspondence, supplemented by conferences at Washington, and at industrial centers.

OBITUARIES

Lewisite Inventor Dies

W. Lee Lewis, 64, chemist and inventor of the "Lewisite" gas used by Allied armies in the first World war died Jan. 20 in a suburban Evanston, Ill., hospital of injuries suffered in a fall. He was head of the Dept. of Chemistry, Northwestern University, from 1919 to 1924.

Julius Jungmann

Julius Jungmann, 92, president of American Fluoride Co., died Dec. 31 at his apartment in New York after several days' illness.

Emory L. Ford

Emory Leyden Ford, president of Michigan Alkali Div., Wyandotte Chemicals Corp., died Dec. 20 from a heart attack. He was 66 years old.

James P. Pierce

James P. Pierce, Jr., 52, president of the Barium Reduction Co., Charleston, W. Va., and a pioneer in the Great Kanawha Valley chemical industry, was found dead Jan. 18 in his wrecked plane in an isolated mountain area near Richwood, Va. Long a holder of a pilot's license, Mr. Pierce was returning from Washington to Charleston when his plane crashed near the top of a mountain.

Edgar S. Harrington

Edgar S. Harrington, 55, secretary for the last 14 years of the Turco Products Co., manufacturers of industrial chemicals, died of a heart attack on Jan. 16 at his home in Los Angeles, Cal.

Hamilton C. Ulen

Hamilton Carr Ulen, 73, founder and president of the Ulen Chemical Co., died unexpectedly at his home in Toledo, Ohio, on Jan. 13.

Cesare Protto

Cesare Protto, 58, assistant general manager of the Organic Chemicals Department of Du Pont for 13 years, died Jan. 22 after an illness of several months. His home was in Westover Hills, Del.

William H. Hazzard

William H. Hazzard, 56, secretary-treasurer of the Garnet Chemical Corp. for nearly 10 years, died Jan. 25 in Betts' Hospital, Easton, Pa.

J. F. Hartlieb

The death of J. Frederick Hartlieb, president of Continental Can Company, Inc., occurred at the New York Hospital after an illness of one month. He was sixty-five years of age.

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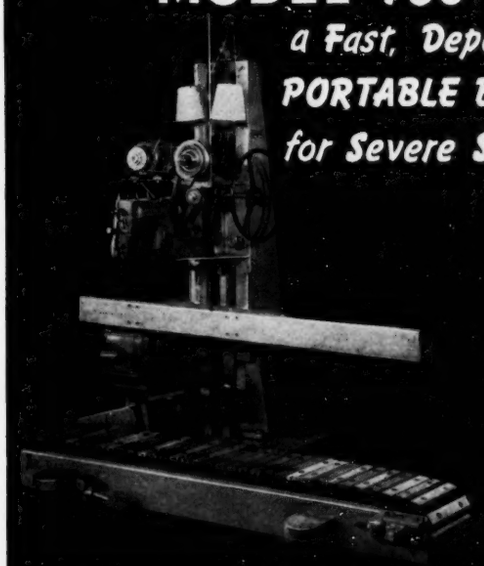

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CHEMICAL SPECIALTY COMPANY NEWS

OPA Meets with Cosmetic and Toilet Goods Industry

REPRESENTATIVES of the Cosmetic and Toilet Goods Industry met with OPA officials on Wednesday, February 3d, to discuss a proposed new price regulation on "Packaged Cosmetics." The meeting took place in OPA's Regional Office in the Empire State Building, and was presided over by Edward P. Morrish, Acting Head, Toiletries and Cosmetic Section, Chemicals and Drugs Branch, OPA, Washington, D. C.

Also present representing OPA were Mrs. Martha Wood, Business Specialist and assistant to Mr. Morrish and Frederick R. Haigh, Chief of the Chemicals and Chemical Products Unit, New York Regional Office.

The meeting was called to give trade and industry representatives an opportunity to discuss the terms of the proposed new regulation and to present suggestions. Several meetings on the same subject have been held recently.

The proposed new price regulation on "Packaged Cosmetics" will replace the General Maximum Price Regulation for manufacturers, distributors, retailers, and other sellers of Cosmetics and Toilet Articles.

Among those present at the meeting representing the Cosmetic and Toilet Goods Industries, were:

N. J. Allderige, Bourjois, Inc.
H. L. Johnson, F. W. Woolworth Co.
Paul H. Douglas, Bourjois, Inc.
Rowland Jones, Jr., National Assn. of Retail Druggists (Wash. Rep.)
Albert B. Pacini, American Home Products
Thomas S. Smith, N.A.R.D.
S. L. Mayham, Toilet Goods Assn.
G. W. Dunn, Elmo Sales Corporation
T. M. Hanlon, Caron Corp.
Paul B. Russell, Lucien LeLong, Inc.
Benj. H. Dorman, United Drug Co.
E. A. Means, Bristol-Myers Co.
S. P. Humphrey, United Drug Co.
Leo V. Talamini, Prince Matchebelli, Inc.
F. C. Cleary, Richard Hudnut
C. A. Pennock, Hudnut Sales Co.
Irving C. Fox, National Retail Dry Goods Assn.
H. L. Brooks, Coty, Inc., 423 West 55th Street, N. Y. C.
James G. Potter, Richard Hudnut
Thomas W. Johnston, R. H. Macy & Co.
Charles W. Fowler, Lord & Taylor
R. C. Payton, Yardley of London, Inc.
Irving S. Goodwin, Yardley
F. J. Griffiths, National Assn. Chain Drug Stores
R. J. Van Gytenbeek, B. Altman & Co.
A. Nasheim, House of Tre-Jur, Inc.
Nicholas S. Gesoulde, N. Y. State Pharm. Assn.
G. W. Sands, Elizabeth Arden
E. Allen Newcomb, Nat'l Wholesale Druggists Assn.
J. W. Newman, Lehn & Fink Products Corp.
A. H. Bergmann, Oxsym Co.
Joseph A. Danilek, Dorothy Gray Ltd.
Jule Gordon, Nat'l Beauty & Barber Industries Assn.
B. H. Badanes, McKesson & Robbins, Inc.
T. L. Blanke, Nat'l Retail Dry Goods Assn.
Robert F. Fiske, Saks Fifth Avenue
Miss A. Farley, Lord & Taylor
Philip C. Herr, Denny & Denny
H. M. Altshul, Ketchum & Co., Inc.
Wm. E. Hinkel, Wm. E. Hinkel Co., Inc.
Thomas A. Weaver, Sibley Lindsay & Curr
W. H. Wulffleff, Affiliated Products Co.

Fire Prevention

Fire Prevention Exhibition at N. Y. Museum of Science and Industry presents a powder fire extinguisher which snuffs out gasoline and other inflammable liquids. After the demonstration, a motion picture depicts larger and more hazardous fires being controlled by the same method. According to the manufacturer, with a supply of this powder available, the housewife has a safeguard against fire in the event of bombs, sabotage or other causes of failure of the normal water supply.

Wartime Packaging Exhibit

The first wartime packaging exhibit has been opened to the public by *Modern Packaging* magazine in the Chanin Bldg., N. Y. City. Displaying outstanding packages entered in the 12th annual All-American Package Competition, the exhibit shows paper substituting for tin, aluminum, and other metals and new packaging applications of glass.

AMA Sponsors Packaging Conference

Wartime Packaging Conference and Exposition to be held at the Astor Hotel, N. Y. City, April 13 to 16 will be devoted to war aspects of packaging, packing and shipping. An extensive special exhibit by various government agencies of war packages and shipping methods will be a feature of the exposition, according to the American Management Assn., sponsor of the conference.

Cyclo Changes Name

Cyclo Solvents & Chemicals, Ltd., Strand, London, announces the change of its name to Cyclo Chemicals, Ltd.; the directorate, staff, offices, and works will not be altered.

PERSONNEL

Rudolph R. Cubicciotti has joined L. Sonneborn Sons, refiners of petroleum products and manufacturers of paints and waterproofings, as executive assistant to Julius F. Roten, vice-president. Formerly Mr. Cubicciotti was associated with Union Oil Co. of Calif. as chemical engineer for seventeen years.

Rudolph R. Cubicciotti

Neldon Hoyt, formerly with Allied Products Co., has joined Evans Chemetics, Inc., as production manager.

Louis F. Theurer, industrial sales manager, Milwaukee Paint Division, Pittsburgh Plate Glass Co., has been appointed west coast divisional director, succeeding Floyd S. Green, who is retiring. **R. I. Ogle,** industrial paint sales representative in the Chicago territory, will be industrial sales manager at Milwaukee.

BETWEEN THE LINES

Transportation hazards of our globe-encircling supply lines are beyond anything previously experienced either in war or peace-time industry. Proper packaging requires that many materials until recently untouched by the war effort must now go on the restricted list. Although intensive efforts are being made to devise substitute containers and packaging for various materials, practically all materials used in commercial packaging will become scarce. Only materials absolutely essential to the sanitation and preservation of consumer goods will be allocated to civilian use. However, the present hardships have a bright side as the packaging industry has grown to a point never before attained. The war has seen packaging emerge from the status of a trade into the category of a science.

IN an earlier issue this department carried the forecast from those watching the matter, that an increasing stringency would occur in all types of containers. This forecast is now materializing in many fields and the current shortage of metal containers is affecting a number of chemical products.

The problem is engaging attention of not just emergency agencies at Washington, but old-line departments. The Agricultural Department for instance, is interested in containers utilizing for raw materials various chemurgical developments, both as to the body of the container, and as to coatings.

Changing Situation

The changing nature of the situation in chemical containers illustrated by a forthcoming requirement from the War Production Board that will prohibit use of steel drums for many products, including various chemicals. On the other hand, experiment has now demonstrated that a still larger number of chemical materials or products cannot use the substitute containers that were first considered. It is therefore necessary to authorize that the latter category be packed in steel drums.

The last-mentioned group, for which no substitute for metal containers has been found, includes copper sulfate, monohydrated; amyl acetate, amyl alcohol, amyl phthalate, butanol, butyl acetate, butyl oxalate, butyl phthalate, ethyl acetate, ethyl carbonate, all grades; ethyl oxalate, ethyl phthalate, sodium chlorate and potassium chlorate. For various reasons certain oils have been placed on the list which can be packed in steel drums, either new or used. A number of dry compounds will no longer be authorized to be packed in steel drums.

There is even an inclination to risk possible contingencies by directing certain industries to use substitutes for metal containers, though a miscalculation as to the weather or proper storage conditions might cause trouble. Thus, due to the curtailment of steel available for the current year, which will reduce by about 30 per cent the steel in sight for naval stores drums this particular industry will be compelled to resort to wood barrels, paper bags, fibre drums and tank cars. Rosin and turpentine are the principal products of the industry. Overheated storage for such materials in less durable containers might have obvious drawbacks.

However, the contingency extends to containers of many kinds. It is already evident that there will be only a limited supply of containers of every kind this year, due to material shortages, labor shortage, and transportation, and the disorganization of accustomed trade practices of normal times.

The naval stores industry for instance, has been warned to plan ahead on its 1943 container requirements in substitute types. This warning is going, or will soon be sent to other users of specialized containers, especially metal drums, and similar types.

A general summary of container prospects shows that there are three widely used substitute types, likewise in demand for normal use where steel or other metal containers are the rule; fibre drums, tight and slack cooperage; and that the situation of the three varies is uncertain at this writing. Efforts are being made to augment the 1943 supply of fibre drums. There is a bad situation here currently, but in two to three months there should be an improvement in the supply.

Tight cooperage is available in some quantity, but in the slack cooperage supply a shortage exists due to material difficulties. This suggests a question which many manufacturers ask—What happens if an industry is told it must use one or another of these substitutes, as in the case of some eleven chemicals barred from using drums?

Priorities on Substitutes

While it is not definite yet, it is understood that consideration is being given to a series of priority orders which will govern the use of substitute containers by such industries. Priority will be extended on a basis of essentiality of the product, and its relative adaptability to other than its regular container. This plan is not final by any means, but it is one solution now being weighed. If it goes through, many essential chemical manufacturers who for one or another reason, have been compelled to look for new types of container, would be given first choice over some strictly civilian producer.

The question of raw materials for fibre drums, kraft board boxes and similar containers, is a troublesome one. The shortage in pulp supply is a factor, along with many others. Under consideration is the idea of reviving and pushing the waste paper campaign of some time back. This would supply material for some types of non-food type containers.

It was recalled by container authorities at Washington also that certain types of boxes were made of virtually new pulp, and when reclaimed, this pulp would go into a satisfactory kraftboard or similar container product. But efforts will be made to shift many products, including such as dry chemicals or solids, to wooden packaging. There is also shortage here, however.

Meanwhile to get the best use of available steel drums, several restrictions in L-197 will be modified to exempt steel containers used for specified purposes. These exemptions will ease the problem for many chemical producers, since so large a proportion of the latter are in an essential class.

Thus drums containing materials for military production, as distinguished from the previous restriction that exempted drums only for delivery directly to Army, Navy, etc., are now exempted. Steel drums of a capacity of over 30 gallons and of 23 steel gauge are exempted. Drums containing materials for repair, maintenance and operating supplies aboard ship are released.

CANADIAN REVIEW

By Kenneth R. Wilson

OTTAWA—Of life and death importance to Canada's wage and price control machinery is the outcome of a strike which closed two of Canada's biggest basic steel plants in January.

In March, 1942, workers in two plants which produce 40% of Canada's basic steel output applied for an increase in basic wage rates. Under Canada's wage ceiling this increase was not justifiable unless it could be shown that the wages at these plants were out of line with prevailing rates in similar occupations or classifications. The dispute has continued through more than nine months with regional boards and a Royal Commission (appointed specially for the purpose) agreeing that no such increase in basic wage rates was justifiable under the terms of Canada's wage ceiling. The Royal Commission findings were announced early in January and a few days later 13,500 workers at Sault Ste. Marie and in Nova Scotia went on strike.

K. R. Wilson

The matter came before a full-dress conference of worker and management representatives who met the Canadian Prime Minister and his Cabinet in Ottawa the week of January 18. Out of the conferences came two important proposals made by the government as a means of settling the strike: (1) that basic steel production in Canada be treated on a national rather than a regional basis; (2) that the basic minimum wage in both plants be increased to 55 cents, inclusive of cost of living bonus payments. The union had asked basic wages which would have netted workers a minimum rate of 60 and 64 cents per hour, inclusive of the bonus which varies in the two plants.

The basic wage rate is the rate paid in the lowest classification of labor. For more skilled workers the wage rate rises according to classification—65½c, 75c, 85c, $1.00, etc. In the event the basic rate is increased it is expected that all rates will rise proportionately.

There are two important implications in these proposals.

The permission to place steel on a "national" basis means an open door to a unified labor front in this industry and eventually uniform rates throughout all plants. Till now the largest individual steel company (Steel Co. of Canada with 40% of Canadian tonnage) has not been unionized. It means inevitably, increased basic rates throughout this entire industry.

The next point, not as yet clarified and deliberately left open in the government proposal for settlement, is whether or not the new basic minimum applies only to those receiving less than the proposed rate or whether it is to apply proportionately to all workers.

If all workers in basic steel are granted the increase the general view here at Ottawa is that it means the end of Canada's wage ceiling "freeze" as established as of November 15, 1941. And once the wage ceiling goes, it is going to be difficult if not impossible to "hold" the present overall ceiling policy. Certainly, as this is written, the general feeling here is that the government has "sold the fort" so far as the 1941 wage-price ceiling is concerned and that it will take something near a miracle to hold the lines after the smoke of the steel battle has finally cleared away.

Ruml Plan Favored

Interest in the Ruml pay-as-you-go plan is as great here as in the United States. Mr. Ruml made several personal appearances before Canadian audiences during January and received enthusiastic acclaim. Canada is already on an outright "withholding" tax basis with 90 per cent of estimated tax liability being collected directly at source by all employers. These collections are only one-third of the way towards meeting the Ruml plan since Canadian income taxpayers will not complete their 1942 tax payments until August, 1943.

When the Canadian Parliament meets early in February it is expected that the government will indicate approval for or even immediate adoption of the pay-as-you-go principle. Normally, such announcements are not made in Canada until the government brings down its budget. Last year this was not until midsummer. But public interest in and approval of the Ruml plan has reached such proportions that an early indication of government policy is indicated.

Bond Problem

In connection with its war finance program, Canada is running into a new and unexpected difficulty in the large number of small denomination war bonds and war savings certificates which are "bouncing" back after having been sold to wage earners on wage-deduction or installment plans and figures released this month show that out of 1,120,000 individual $50 war bonds sold in the Second Victory Loan Campaign of February 1942, no less than 270,000 or 24% had been cashed by individuals within nine months of the original sale. Most of the unloading came at about the time that payment for the bonds had been completed.

Now underway are extensive plans to "conserve" these original sales in much the same way that life insurance companies attempt to prevent lapses of policies. It is probable that the conservation efforts of the Canadian National War Finance Committee may become in some respects as extensive as the machinery set up through plant committees, etc. to sell the bonds in the first place. Much of the difficulty lies of course in the kind of sales job that is done initially and it is hoped that later loans will "stick" better for the reason that they were more thoroughly sold.

The Canadian experience suggests that plant conservation of war bond sales is as important a job as making the initial sale.

Amended Plan for Steel Strike Settlement

Editor's Note. The following information was obtained after the above article was written.

The terms of settlement agreed upon by union representatives and the Government were basically the same as the seven-point proposal made by the Government earlier, and which was rejected by the union at the time. The amended plan provides for:

1. Immediate action to implement the majority report of the Barlow Commission, including its recommendation for higher pay for certain maintenance men; time and one-half for working a seventh day in any week; reclassification of jobs; appointment of management-union-employee committees.

2. Recommendation that the Algoma Steel Corp. at Sault Ste. Marie, Ont., and the Dominion Steel & Coal Corp. at Sidney, N. S., be designated as "national employers" and so placed under jurisdiction of the National War Labor Board.

3. Opportunity for the steel-workers to present a new wage case to the Board.

4. Appointment of a new chairman for the Board, replacing Labor Minister Humphrey Mitchell, thus providing a Board chairman who has not previously considered the dispute.

5. Recommendation by the Government that the Board give earliest consideration to any application by the steel-workers.

6. Passage of an Order-in-Council guaranteeing 55 cents an hour minimum pay, retroactive to Nov. 1, 1942, at the

(*Continued on page 240*)

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MARKETS IN REVIEW

WAR industry, agricultural, and lend-lease requirements for industrial chemicals are steadily growing and producers are watching deliveries carefully so that they will be in a position to meet emergency or unexpected demands for vital supplies. One encouraging factor is said to be that consumers have been quite optimistic in figuring out their tonnages for the year and thus have made possible the following cautious policy of producers.

Cross-haul of Chemicals: General Transportation Order T-1 issued by the W. P. B. on January 30 extends the cross-haul ban and tankcar limitations to the chemical industry.

The order sets up three lists according to the following descriptions.

List I materials.—(1) No person shall originate a controlled shipment of any List I material, except as specifically authorized or directed by the Director General for Operations.

(2) Any person seeking authorization to originate a controlled shipment of any List I material may make application on Form PD-782, or, in emergency, by telegram, containing substantially the information called for by such form.

List 2 materials.—(1) Each person shall report on Form PD-782 on or before the 20th day of each calendar month all shipments of List 2 materials which he then intends to originate during the succeeding calender month.

(2) Each person shall report on Form PD-782 on or before the 10th day prior to origination any controlled shipment of List 2 materials which he then intends to originate and has not previously reported.

(3) Any person may originate a controlled shipment of List 2 materials reported pursuant to paragraph (1) or (2), unless otherwise specifically directed by the Director General for Operations.

(4) No person shall originate a controlled shipment of any List 2 material which has not been reported pursuant to paragraph (1) or (2), except as specifically directed or authorized by the Director General for Operations. Applications for such authorization may be made by telegram containing substantially the information called for by Form PD-782.

List 3 materials.—This order does not restrict shipments of List 3 materials, except to the extent that such shipments are controlled shipments of Lists I or List 2 materials.

List I referred to molasses and caustic soda; list 2 to acetone, butyl acetate, corn syrup, ethyl acetate, ethyl alcohol, and molasses; list 3 referred to a large number of additional chemicals. For more information write directly to the W. P. B. in Washington asking for a copy of General Transportation Order T-I.

Heavy Chemicals: War industry requirements, along with Federal agencies and Lend-Lease are keeping the heavy chemical market quite active.

Alkalies are reported to be in good demand with the volume to the glass container manufacturers increasing and with a good export demand. The industry is also looking forward to increased withdrawals of alkalies by the synthetic rubber industry as the plants begin to come into production.

The demand for copperas is reported to be running in advance of supply as its part in the war program increases.

Since the opening of the North African campaign it has been expected that the phosphate situation would ease. It is understood that considerable quantities of phosphate rock are obtainable in Africa and it was thought possible that Great Britain would be able to obtain material from that source, thus relieving the drain on American phosphate.

Improvement was noted in demand for caustic potash. New uses and war requirements took increasing amounts and offset the reduced withdrawals on the part of the soap industry.

Copper sulfate is moving at an increased volume against releases by the W. P. B. February releases on copper chemicals were substantially increased by the W. P. B.

Flame-proofing and fiber-treating chemicals are greatly in demand as both military and civilian needs increase.

With the fertilizer season getting under way and manufacturers coming into the market for increased supplies, the already large demand for sulfuric acid forecasts early action on placing this basic chemical under allocations.

Phosphate manufacturers are running behind on their deliveries as demand increases for sodium, di-sodium and tri-sodium phosphates and as nearly all available elemental phosphorus must go into the manufacture of war materials. With these materials becoming more and more difficult to obtain manufacturers of cleaning compounds may find themselves in a pinch and have to get along with smaller supplies.

Although machine tool manufacturers are getting supplies of carbon tetrachloride other users are finding difficulty because of the container situation.

Calcium chloride makers are reported to be running behind on deliveries what with the demands for the use of this chemical for ice control, cold weather concrete and other uses.

Fine Chemicals: The heavy demand for pharmaceutical and drug products by Government agencies, wholesalers and manufacturers has continued to create shortages.

The War Production Board has circularized 58,000 pharmacists throughout the country in an appeal to them to contribute all surplus quinine or opened packages. These stocks are to help build up a pool established by the American Pharmaceutical Association and the Drugs and Cosmetics Section of the Chemicals Division, W. P. B., to be used by the armed forces overseas.

A strong demand exists for the still scarce products, sodium benzoate, butyl alcohol and butyl acetate.

The announcement, during the first part of the month, that methanol would be placed under complete allocation on January 15 did not bring about any rush to stock up on the material. There is a steady flow to formaldehyde manufacturers and the market as a whole has a very steady tone.

Synthetic vitamins, citrates, citric acid and other pharmaceutical chemicals are in strong demand. The food industry and federal agencies have kept pushing the vitamin producers in particular. With regard to citric acid, it is said that civilian consumers will be lucky if shipments are not cut below the present program of 50 per cent of monthly deliveries in 1941.

All salicylates are scarce and in view of present conditions surrounding the basic raw material, phenol, little relief is expected for some time to come.

Higher raw material costs have resulted in a price advance of 1½ cents a pound for domestic camphor the demand for which remains brisk.

Users of menthol are facing a serious problem as the reserve supplies are becoming exhausted and the outlook for new supplies is not encouraging.

Coal Tar Chemicals: One of the major coal tar chemical developments recently came on January 19 when phenol prices were reduced two cents a pound, bringing the price to 9½ cents in tank cars, 10½ cents in carload lots and 11¼ cents for less than carlots. The cut in price was attributed to economies brought about by increased production. However the material will still be difficult to obtain

except for certain war requirements. Strong efforts are being made by phenol producers to keep production up to the growing essential needs. Large quantities are going into lend-lease shipments and the manufacture of resins and plastics. Added to these is the increasing quantity going into munitions production.

Although the production of toluol is increasing it is still going into munitions manufacture as rapidly as it is produced. Xylol, even though it is under allocation is in an easier position and it is felt in trade circles that some may be made available to certain users who ordinarily depend on scarce items such as benzol and toluol.

Naphthalene continued in good movement especially to phthalic anhydride producers and manufacturers of intermediates and insecticides.

Inquiries for cresylic acid remained active. The loss of a shipment from Great Britain was felt for a time and considerable interest was shown in reports that additional lots were afloat. It was believed that the safe arrival of these shipments would ease the current need.

Naval Stores: The rosin and turpentine markets have been quite slow during the past month. Inquiries from the federal agencies were the only high spots. These inquiries aroused a great deal of interest and comment in trade circles. With government control more or less regulating the market and with the solid foundation on which all eligibile gum turpentine and gum rosin now rests, absences of current demand or changes in market quotations are said to have little significance.

According to the Savannah *Naval Stores Review* the final report on the government stockpile purchases of gum naval stores for the year 1942, completed this week, shows that the government now holds stockpiles of these commodities totalling 151,969 barrels of turpentine and 344,303 drums of rosin representing over 48 per cent of the total quantity of gum turpentine which it is estimated will have been produced by the close of the season ending March 31st, next, and 39 per cent of the total gum rosin production for this season.

Fertilizer Materials: The demand for agricultural chemicals is increasing as the fertilizer season gets under way. Nitrate of soda, ammonium sulfate, cyanamid, urea and ammonia liquors have been allocated in increased amounts for the important job of keeping food production up.

A very interesting development in the chemical market occurred last month with the arrival of about 10,000 tons of muriate of potash from Russia. This marked the first arrival of imported potash in about two years. Domestic producers had already sold their production up to March, so that this amount, although comparatively small, eased the situation somewhat.

Allocations: Among the allocations of chemicals for February, which have been announced by the War Production Board, are the following:

ACETIC ANHYDRIDE

Granted in full for triacetin and diacetin, aspirin, acetanilid, acetophenetedin, other pharmaceuticals, synthetic vitamins, dyes and intermediates 1/, textile processing agents 2/, synthetic flavoring and perfume bases 3/, and research.

Granted in part for cellulose acetate yarn (97%), cellulose acetate staple fiber (93%), cellulose acetate plastic and film (78%), cellulose acetobutyrate (65%), and cellulose acetopropionate (78%).

1/ 0.04% of total allocation.
2/ 0.01% of total allocation.
3/ 0.2% of total allocation.

ACRYLONITRILE

No acrylonitrile was allocated for civilian uses.

AMMONIA, Anhydrous

Granted in full for aqua ammonia, synthetic sodium nitrate, ammonium sulfate, activated carbon, agriculture, amines, cellophane, chemical manufacture, dry cell batteries, dye intermediates and dyestuffs, industrial explosives, export, films and photo chemicals, food processing, insecticides, metal treating and nitriding, nitrous oxide, petroleum, plastics and synthetic resins, rayon, re-

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frigeration, silica gel catalyst, sulfuric acid, textiles, water treatment.

Granted in part for nitrocellulose (90%).

AMMONIA, Aqua

Granted in full for ammonium chloride, copper sulfate, corrosion control, chemicals, di- and mono-ammonium phosphate, dye intermediates, explosives, metal refining, mildewproofing, pharmaceuticals, rayon, resale, silica gel, soda ash, sulfuric acid, textile finishing, and yeast manufacturing.

AMMONIUM SULFATE

Granted in full for agriculture, alcohol, ammonium nitrate, cellulose, dyes and pigments, export, insulation, leather bates, rayon, resale, textiles, and yeast.

ANILINE (Salt and Oil)

Aniline was granted in full for diphenylamine, sulfa drugs and other drugs, dyes, rubber chemicals, plastics and resins, fine chemicals and also for export.

AROMATIC PETROLEUM SOLVENTS

Granted in full for cleaning and degreasing (such as bus line and railroad equipment, engines, etc.), chemical uses (dyestuffs, gravure printing, vitamin synthesis, and alkyd resin solutions), textile treating (fiber treating, fiber scouring, textile printing, waterproofing, hospital sheeting), health and technical equipment (optical goods, surgical instruments), transportation (railroads, bus lines).

Denied for all other uses.

CALCIUM CARBIDE

Calcium carbide for resale was granted in part for resale (65%) and for export (56%).

CHLORINE

Granted in full except as follows:

Carbon tetrachloride (M-41) (98%), chlorinated paraffins (M-189) (86%), bleaches and gumicides (estimated 50% household bottled bleach; 50% laundries, bottlers, industrial) (88%), pulp and paper (pulp under allocation M-52, M-93, M-251; Paper under L-11, also M-241) (85%), and textiles (all for bleaching and finishing) (93%).

COPPER CHEMICALS

The allocations of copper chemicals were based upon restricting consumers to a practicable minimum working inventory.

In the case of wood preserving, manufacture of chemical heating pads, and manufacture of soot remover compounds, allocations were denied pending further investigation as to the essentiality of the products.

DIBUTYL PHTHALATE

Granted in full for cellophane and photographic film. Granted in part for industrial lacquers (36%), other lacquers (13%), Class I plastics (6%), textile coatings (hospital sheeting) (17%), synthetic rubber (88%), shoe adhesives (9%). Denied for Class II plastics and Class III plastics, textile coatings (other than hospital sheeting, cellophane adhesive, and adhesives (other than shoe adhesives).

DIETHYLENE GLYCOL

Granted in full for chemical manufacturing and for cutting oils. Granted in part for tobacco humectant (57%), general textile (68%), general plasticizer (64%), and cosmetics (57).

DOMESTIC CRESOLS AND CRESYLIC ACIDS

Granted in part for medicinals (61%), disinfectants and insecticides (14%), dyes and inks (18%), and chemical manufacture (61%), tricresyl phosphate (75%) and plastics (M-246) (50%).

ETHYL CELLULOSE

Granted in full for abrasive cloth—special backing, special photo engraving (stripping compound), special oil resistant coating—turbine, plating (special), special heat sealing compound, special label adhesive, special waterproof adhesive, gaskets—glass can (special), and cement X-ray screens.

Denied for jewelry display pads, artificial leather, hat lacquer, drier for varnish, adhesive for wool pile, shoe fabric adhesive, shatterproofing glass, luminous paint, tracing paper, non-ravel solution, mirror backing, fumigant hoods, furniture, construction, paint remover, box car sealer, enamel, machinery coating and maintenance.

ETHYLENE GLYCOL

Granted in full for anti-freeze, for general textile, for chemical manufacturing cosmetics.

Granted in part for cellophane (91%), and general plasticizer (13%).

FURFURAL (REGULAR)

Granted in full for petroleum refining and chemical manufacture. Granted in part for resin manufacturing (43%). Denied for resin manufacturing.

GLYCERINE

Allocations for civilian requirements were based on the percentage of base period indicated or on the amount requested, whichever was the larger, but in no case exceeding 100% of civilian request. Designation "BP" following percentage indicates only base period was considered in making civilian allocation.

Gelatin capsules (drugs and pharmaceuticals) (100%), basic chemicals (drugs and pharmaceuticals) (100%), explosives (100%), rubber (100%), gaskets (100%), meat casing (cellulose film) (100%), greaseproof paper (100%), parchment (100%), printer rollers (100%), dye manufacturing (M-103) (100%), shoe adhesives (100%), cutting oil base and emulsions (100%), sealing compounds (100%), lubricants (100%), polish and wax (100%), packing compounds (100%), plasticizers (100%).

Miscellaneous drugs and pharmaceutical (70% BP), resins (50%), ester gums (25%), crown liners (50%), caps and bands (70% BP), miscellaneous cellulose film (70%), glassine (70%), printer supplies (70%), textiles (other than dye manufacturing) (50%), leather (50%), flexible glue (70% BP), coating compounds (70% BP), miscellaneous adhesives (70% BP), shaving cream (25% BP), hand and face lotions (25% BP), other cosmetics (except shampoos and hair tonic and soap) (25% BP), triacetin and diacetin (50%), reconstructed oils (70%), synthetic detergents (50% BP), embalming fluid (100% BP), polish and wax (25%).

Glycerine for cellophane for all purposes was granted to the extent of 70% of total requests. Emulsifiers were allocated 100% of requirements for margarine, limit 0.06%. Glycerine in margarine, shortening and all other edible products were granted 35% of base period. Glycerine for tobacco was granted 50% of requirements as reported by Tobacco Section of WPB.

Alcoholic beverages (0%), soft drinks (0%), food colors (0%), candy (0%), shampoos and hair tonics (0%), soap (0%), and core oil (0%). All other uses (20%).

ISOPROPYL ALCOHOL (95%)

Granted in full for acetone, brake-fluid, cleaners and removers, cosmetics, germicides and disinfectants, chemical manufacturing, isopropyl acetate, rubbing alcohol, technical coatings, textiles, waterproofing, and wetting agents.

ISOBUTYL ALCOHOL

Granted in full for urea formaldehyde resins, hydraulic brake-fluids, ethylene anunes, isobutyraldehyde, stabilized vapor degreasing solvent, and dyes. Granted in part for rayon lubricants (31%).

ISOPROPYL ALCOHOL (91%)

Granted in full for acetone, brake-fluid, cleaners and removers, cosmetics, germicides and disinfectants, chemical manufacturing, isopropyl acetate, rubbing alcohol, technical coatings, textiles, waterproofing, and wetting agents.

ISOPROPYL ALCOHOL (99%)

Granted in full for acetate. Denied for all other uses.

LITHIUM COMPOUNDS

Granted in part for glass and ceramics (50%), and medicinals (55%).

METHANOL (Synthetic)

Granted in full for hexamethylamine-tetramine, dimethyl aniline, methyl chloride, methylene chloride, methylamines, methyl formate, formamide, acetic acid, ethylene glycol, denaturant, brake fluids, chemical manufacturing and pigments, gasoline inhibitors, solvent for phenolic resins, oil additives, research, rubber, nylon intermediates, and aromatic chemicals.

Granted in part for formaldehyde (80%), pentaerythritol (46%), dimethyl phthalate (63%), cellulose plastics and cellophane (78%), dye and dye intermediates (86%), other methyl esters (91%), drugs and pharmaceuticals (86%), wood stains (43%), protective coatings (65%), antifreeze other than auto (98%), extractions and solvents uses (92%), duplicating inks (39%), embalming fluids (75%), lubricating and cutting oils (65%), photographic and reproduction products (98%).

Denied for automotive anti-freeze and methyl acetone.

METHANOL (Wood Distilled)

Granted in full for denaturant alcohol, anti-freeze (other than auto), extraction and solvent uses and paint and varnish remover.

METHYL ETHYL KETONE

Granted in full for rotogravure inks, rewaxing, lubricating oils, and cellulose acetate sheets. Granted in part for hospital waterproof sheeting (74%), gasoline inhibitors and oil additives (50%), lacquers and thinners (toluol substitute) (12%), cleaners and removers (17%), vinylite coatings (53%), textiles (38%), and accelerators (49%). Denied for soaps and cosmetics.

NAPHTHALENE

Granted in full for intermediates (other than beta naphthol), chemical compounds, and phthalic anhydride. Granted in part for beta naphthol (95%) and moth prevention and insecticides.

PHENOL

Granted in part for triphenyl phosphate (92%), substituted phenols (82%), phenolic resins (71%), salicylates (91%), other medicinals (45%), chlorinated phenols (39%), preservatives and disinfectants (61%), dyes and inks (24%), chemical manufacturing (25%), and miscellaneous small uses (71%).

PHTHALIC ANHYDRIDE

Granted in full for food and drugs. Granted in part for resins (85%), esters (93%), dyes and intermediates (84%), and for rubber, dehydrating oils, and experimentation (99%).

POTASSIUM CHLORATE

Granted in full for railroad flares and fuses, mining explosives, and export, Granted in part for fur dyeing (75%), and matches (78%).

PROPYLENE GLYCOL (Regular)

Granted in full for brake, hydraulic, and deicer fluids, and for anti-freeze. Granted in part for tobacco humectant (52%), for chemical manufacturing (99%), general plasticizer (93%), drugs (99%), cosmetics (29%), foods and flavors (80%). Denied for general textile manufacturing.

SODIUM CHLORATE

Granted in full for chemical processing, soot removing compounds, colors, dyes or intermediates, textile processing (printing and dyeing), pharmaceutical, and fumigation. Granted in part for export (96%) and weed control (97%).

SODIUM NITRATE

Granted in full for agriculture, chemical salts, chemical manufacturing enamels and ceramics, industrial explosives, food preserving, glass, insecticides, metallurgy, nitric acid, pigments and dyes, potassium nitrate, and sulfuric acid.

THEOBROMINE

Granted in full for medicinals except where inventories were excessive.

TOLUOL

Granted in full for protective coatings, medicinals for export, miscellaneous chemicals for export, laboratory research. Granted in part for dyes and intermediates (30%), solvents (67%), rubber accelerators (39%), food preservatives (87%), medicinals (73%), miscellaneous chemicals (56%), and dyes and intermediates for export (35%). Denied for cleaning and adhesives.

TRICRESYL PHOSPHATE

Granted in full for lacquers, photographic film, oil additive, and lubricants. Granted in part for textile coatings (hospital sheeting) (26%). Denied for other textile coatings, synthetic rubber and adhesives.

TRIETHANOLAMINE

Granted in full for resale, export, and inhibitor. Granted in part for chemical manufacturing (83%), soluble oil (88%) solvents (63%), emulsion (99%), plasticizer (81%), cosmetics (36%), and miscellaneous small uses (51%).

TRIETHYLENE GLYCOL (Regular)

Granted in part for chemical manufacturing. Denied for general plasticizer.

TRIPHENYL PHOSPHATE

Granted in full for plastics, photographic film, and textile coatings.

VINYL ACETATE MONOMER

Granted in full for monomeric vinyl acetate (Subject to M-10).

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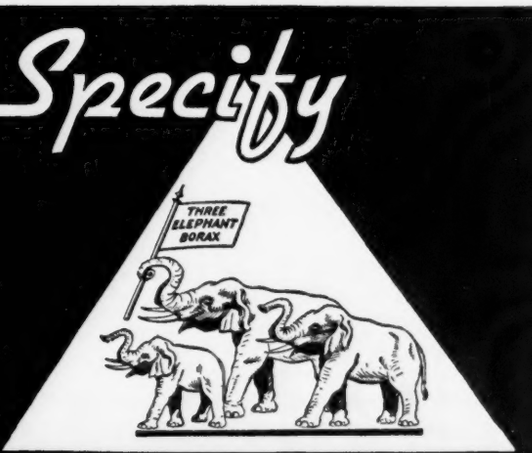

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122 EAST 42nd STREET NEW YORK

Carbon Dioxide

(*Continued from page 211*)

Extinguishing fires, especially in flammable liquids and electrical equipment.

Safe "blasting" of coal and such materials as caked stores of salt, sulfur, etc., by the use of cartridges filled with liquid carbon dioxide.

Preserving in sealed containers such foods as milk powder, coffee, prepared cocoanut, cashew nuts, and cod-liver oil.

Preserving, while in refrigerators, such foods as meats, poultry, sea-food, dairy products, and some fruits and vegetables.

Providing heat insulation, as carbon dioxide gas has a much lower thermal conductivity than nitrogen, oxygen, hydrogen, or air.

The following are special applications of solid carbon dioxide:

Freezing gummy materials, such as rubber, chicle, and raw hide, in order to permit grinding or other treatment.

Dehydrating certain gases and organic liquids by freezing out their aqueous content.

Dewaxing oils in a similar manner.

Testing metals, oils, etc., at low temperatures.

Keeping aluminum rivets, used in airplane manufacture, at a low temperature before use, which prevents them from becoming hard and brittle.

Creating a high vacuum in exhausted containers, such as radio and neon tubes and laboratory apparatus.

Creating porosity in materials, as in the manufacture of sponge rubber or in "raising" dough.

Checking the flow of chlorine gas from leaking cylinders containing the liquid.

Making shrink fits in machine shops, by cooling the inserted part before insertion.

Manufacture of Liquid Carbon Dioxide

As carried out at the Saltville (Virginia) plant of the Mathieson Alkali Works, Inc., liquid carbon dioxide is manufactured in the following way.

The raw material used is the limestone rock that underlies Saltville and consists of more than 99 per cent calcium carbonate. The rock is calcined in long rotary kilns, and the resulting gas, which is hot, dusty, and mixed with nitrogen and other impurities, is passed through a series of water scrubbers to cool it and remove the dust. It is then passed through an absorption system countercurrent to an absorbing solution. The nitrogen and other gaseous impurities are not absorbed, but pass from the system. By heating the absorbing solution, which is high in carbon dioxide content, pure carbon dioxide is evolved and the absorbing solution re-used.

After the hot gas is cooled, it analyzes 99.95 per cent carbon dioxide, with water vapor as the chief impurity. This gas is compressed by three-stage, 600 h.p. compressors, which deliver it at a pressure of 1,000 lbs. per square inch. It is then cooled to room temperature, passed through specially designed filters and dryers to remove the last traces of water vapor and other impurities, and, still under 1,000 lbs. pressure, is cooled to about 40°F., which causes it to liquefy.

The liquid, which may be shipped as such or converted into the solid form, is stored in large tanks. Shipment is made in chromium-molybdenum steel cylinders.

Manufacture of Solid Carbon Dioxide

In making solid carbon dioxide, the liquid, at 1,000 lbs. pressure and room temperature, is allowed to expand in a "flash" tank. About half of it flashes into gas, while the temperature of the remainder falls to –40°F. The gas goes back to the compressors, and the cold liquid is expanded again. This time, about half of the liquid is converted into "snow" at a temperature of –110°F.

The snow is prepared for shipment by compressing it into dense blocks, measuring 20 x 10 x 10 inches, by means of hydraulic presses which develop a pressure of about 2,500 lbs. per square inch. Usually, the blocks are sawed into ten-inch cubes, weighing approximately fifty-five pounds each, although full sized blocks are also shipped. The blocks or cubes are wrapped in kraft paper, packed in corrugated paper containers of various sizes, and shipped to local distributing points in specially designed insulated cars.

Handling Solid and Liquid Carbon Dioxide

Solid carbon dioxide must not be allowed to come into contact with the skin as it will cause lesions resembling burns. It should be handled with canvas gloves.

To keep sublimation losses at a minimum, shipments of solid carbon dioxide should, immediately on receipt, be placed in a storage receptacle insulated on all sides with six inches of cork board or its equivalent. Doors or lids should be made tight with gaskets, which should be renewed as soon as they are worn or damaged. Doors and lids should be kept closed as much as possible.

In purchasing solid carbon dioxide, it is well, in these days of uncertain deliveries, to order full sized blocks, rather than the smaller cubes, sawing the blocks into pieces of the desired size just prior to use.

Liquid carbon dioxide is supplied in cylinders containing 20 and 50 pounds net. At 70°F., the pressure within a cylinder is 849 lbs. per square inch.

Cylinders should be handled carefully, stored upright, and never dropped. For rapid delivery of the gas from the cylinders, they should be kept in a warm place, but at no time should they be subjected to temperatures of 130°F. or higher.

Carbon Dioxide Handling Equipment—Iron, steel and brass fittings, containers and piping are suitable for dry CO_2 gas. Valves can advantageously be trimmed with chrome or chrome-nickel steel.

For handling wet gas ni-resist is suitable, as is red brass or acid-resisting bronze. Yellow brass is not satisfactory. Iron valves should be trimmed with chrome-nickel steel. Aluminum or stainless steel piping is satisfactory. Silver is used in some cases.

Should it be necessary to construct equipment for handling liquid carbon dioxide, it should be of ferrous metal and have a bursting pressure of 6,000 lbs. per square inch. Relief devices, operating at pressures between 1,800 and 2,800 lbs. per square inch, should be provided.

Carbon Dioxide as an Asphyxiant—Air containing 10 per cent of carbon dioxide can be breathed for considerable periods without danger. The chief effect of carbon dioxide in this concentration is to increase the rapidity of respiration.

Air containing 50 per cent of carbon dioxide—that is, with its normal oxygen content cut in half—can be breathed safely for a period long enough to permit escape from an enclosure, but prolonged inhalation will produce severe symptoms of suffocation, possibly with fainting.

Air containing more than 50 per cent of carbon dioxide is dangerous. An enclosure with such an atmosphere should be entered only by persons having equipment that supplies fresh air or oxygen. The ordinary canister-type gas-mask is of no protection under these conditions.

Canadian Review

(*Continued from page 234*)

Sidney and Sault Ste. Marie plants and for basic steel-workers at Trenton, N. S., without prejudicing the workers' right to make application to the Board concerning the bonus. The current bonus would be paid as a part of the 55 cent rate and workers would be eligible for any bonus increases; but, in the event of decreases in the bonus, the minimum rate would not be allowed to drop below 55 cents.

7. Opportunity to the Trenton steelworkers to apply to the Board to determine the extent to which Trenton operations are basic steel.

It is provided that nothing in the terms of settlement shall decrease the previous earnings of any employee.

Of the two strike-closed steel mills in Canada, one (Dominion Steel & Coal Corp.) will re-open as a result of the employees' voting to go back to work for a 30-day period at the end of which time their full original demands must be met. At the other (Algoma Steel Corp.) the men refused the proposed terms.

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U.S.I. CHEMICAL NEWS

February ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1943

Dibutyl Phthalate Good Softener for Perbunan Rubber

Imparts Excellent Resistance To Cold and Gasoline Immersion

ELIZABETH, N. J. — Dibutyl phthalate is rated among the most satisfactory softening agents for the compounding of Perbunan type synthetic rubber, it is indicated by the reports of research workers here.

The effect of a number of softeners was studied from the standpoint of response of the compounded rubber to subzero temperatures, and also of contact with petroleum oils. As a result of these tests, it was found that dibutyl phthalate is one of a small group of ingredients which are effective in preventing hardening at low temperatures.

Effect of Petroleum

Since Perbunan is largely used for making hose, gaskets, and other parts subjected to contact with petroleum oils, behavior of the softener under these conditions is a matter of extreme importance. Undue extraction of the softener would result in marked shrinkages in volume of the compounded part. From this standpoint also, dibutyl phthalate shows good resistance to immersion in gasoline, as measured by volume change, tensile strength retention, and low increase in hardness.

Drug Trades Section to Hold Dinner on March 4

The 18th Annual Dinner sponsored by the Drug, Chemical, and Allied Trades Section of the New York Board of Trade will be held at the Waldorf-Astoria in New York on Thursday, March 4.

Following the precedent established last year, it has been announced that a substantial donation to a war charity will be made from the proceeds of the dinner. The cooperation of the industry in maintaining a high level of attendance at the dinner will help to make the contribution as large as possible.

Sulfa Drug Films Studied For Burns, Cuts, Surgery

BALTIMORE, Md.—Translucent films containing sulfa drugs are undergoing study here as a surgical dressing for burns and cuts and for the treatment of wounds. Preliminary reports indicate that the films are effective in preventing infection.

The films are prepared by making an emulsion of 3% sulfadiazine or sulfanilamide, 2.5% methyl cellulose, 3% triethanolamine, and 0.5% sorbitol with ethanol or acetone. This emulsion is sprayed on a smooth glass sheet, from which it is stripped off in the form of a film. The film is applied after preliminary cleaning of the affected area.

New Pittsburgh Address

U.S.I.'s Pittsburgh Office is now located in the Fulton Building, 107 Sixth Street.

New Source of Glycerol Opened By Process Developed by U.S.I.

Fermentation Procedure is Key to Vitally Needed Supplies For Manufacture of Explosives and Other Urgent Requirements

In view of the current importance of glycerol as a raw material in the manufacture of nitroglycerine for explosives, the development by U.S.I. of a commercially practicable method for producing this vital material by fermentation of molasses assumes outstanding interest. Pilot plant operations have demonstrated the feasibility of the technique, and commercial production is soon expected to alleviate the critical demand for glycerol.

Glycerol (more commonly known as glycerine), discovered in 1779 by Karl W. Scheele, is one of the oldest and most widely used chemicals. The value of glycerol rests on its physical properties rather than on its chemical constitution although it is employed chemically to make certain very important compounds. Of the physical attributes of glycerol, the most outstanding is its strong affinity for water. This has led to its employment as a humectant and plasticizer, and since it is non-toxic, it can be used in cosmetics and foodstuffs where an agent for the holding of moisture is necessary to keep the products in condition. Glycerol is a remarkably good solvent, comparing in this respect with water and ethanol. Many antiseptics and essential oils are soluble in glycerol, and this solvent property, combined with the fact that it is non-toxic, gives the compound its unique place in the manufacture of pharmaceutical preparations and as an ingredient of food products.

This article lists some outstanding uses of glycerol in military and civilian applications. A much more detailed listing is given in Bulletin GU, which is available without charge from U.S.I.

Manufacture of Resins

In recent years glycerol has taken an important place in the plastic field as a constituent of alkyd resins. These resins (phthalic anhydride and glycerol) are made in a variety of ways. Glycerol and resin are combined to make the well-known ester gums widely used

(*Continued on next page*)

New Method Described for Making Chroman Compounds

MINNEAPOLIS, Minn. — A novel process for making tocopherol-like chroman compounds has been revealed in a patent granted to an inventor here. Since alpha-tocopherol is Vitamin E, these new compounds, apparently of a similar character, are expected to have medical and biological applications.

Key to the new process lies in the preparation of the primary intermediate. A halo-alkyl derivative of a diether of hydroquinone is first prepared. This compound is then used to alkylate a *beta*-keto ester, preferably ethyl sodium acetoacetate, resulting in the formation of the primary intermediate.

Ethyl sodium acetoacetate is produced by U.S.I.

Non-Discoloring Adhesive Made with Aid of Urethan

WESTFIELD, Mass. — Discoloration of the adhesive on envelope flaps can be prevented by means of a novel formulation involving the use of urethan, it is claimed in a patent granted to an envelope maker here.

The discoloration is caused, according to the patent, by chemical reaction between degraded protein in the paper and reducing sugars in the adhesive. It can be prevented, it is claimed, by decreasing the reducing sugar content. The fluidity necessary to apply the adhesive to the envelope, ordinarily obtained by high sugar content, is achieved by addition of a carbamic acid ester, such as urethan.

The manufacture of nitroglycerine for explosives is one of the most important applications of glycerol. Procedure developed by U.S.I. will make additional supplies available for this and other purposes.

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February ★ **U.S.I. CHEMICAL NEWS** ★ 1943

Applications of Glycerol

(*Continued from preceding page*)

in varnishes. Glycerol is an important ingredient in adhesives, acting as a means of controlling the flexibility of these products so as to give them the maximum of strength under the conditions of use. A similar application is found in certain cements such as the familiar litharge-glycerol combination used as a plumber's cement and a cement for aquaria. Here advantage is taken of the readiness with which glycerol combines with the lead salt used in the cement to form a hard insoluble compound.

Plasticizing Cellophane

One of the outstanding uses of the compound in modern technology is the employment of glycerol in plasticizing cellophane. It is only necessary to consider how widely used this material is to realize the important part that glycerol plays in our everyday affairs. In cellophane the glycerol exists in the form of a solution of approximately 60% strength. About 25% of the weight of the finished product is made up of the plasticizer. Without a suitable softening agent, the cellophane film is brittle and useless.

Lubricating Properties

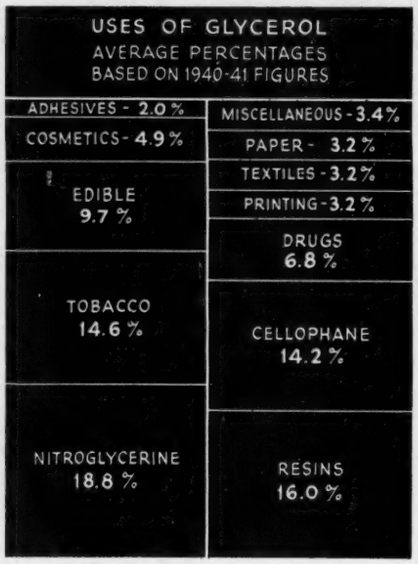
Other widespread uses of glycerol rest on its lubricating properties. Certain machinery used in processing foods must be lubricated with a tasteless and non-toxic lubricant. Glycerol fits these specifications well and has in addition a high degree of stability under the conditions existing in bearings.

In textiles, glycerol has uses which depend largely on its properties as a lubricant. It thus renders fabrics soft and facilitates weaving, and since it is so readily miscible with water, it aids in dyeing and printing operations on cloth.

Another major use of glycerol is in tobacco. Here the hygroscopicity of the material comes into play to keep the tobacco moist and thus to hold it in condition over long periods of time during which the tobacco without such protection would dry out completely. It is difficult to find a substitute for this particular use of glycerol.

Making of Explosives

The most important purely chemical use of glycerol is as a raw material in the manufacture of nitroglycerine for explosives. Modern ammunition requires precisely formulated propellants and nitroglycerine has a place of major importance as an ingredient in these propellants. Since the ballistics of long range guns is based on the propellant, the propellant formula cannot be changed without revising the data on which the aiming of the guns is based. The employment of nitroglycerine in powders overshadows all other uses at the present time.



An approximate breakdown of the amounts of glycerol employed in various fields is shown in the accompanying chart. Four uses, nitroglycerine manufacture, resin manufacture, tobacco conditioning and cellophane plasticizing account for over 60% of all the glycerol produced. The figures in the graph are averaged from 1940 and 1941 statistics.

The use of glycerol showed an increase of approximately 33⅓% from 1940 to 1941, and expanding military use, plus the necessity for adequate stock piling, makes a shortage of this vital chemical a possibility to be reckoned with during the coming months. Substitutions are possible to some extent and certain uses can be curtailed, but the restriction of available glycerol to explosive manufacture and its consequent elimination from all civilian uses poses a very difficult problem due to the widespread use of this versatile chemical.

This brief review of the major applications of glycerol indicates the importance of developing new sources of supply. The fermentation procedure developed by U.S.I. to meet this demand will be discussed in a second article on glycerol, which will appear in the March issue of U.S.I. CHEMICAL NEWS.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

New adhesives, made from a vegetable base, are said to compare in range and flexibility of action with animal-base adhesives. According to the maker, they can be used undiluted or mixed with water, to give firm adhesion in combinations of paper, cardboard, fabrics, leathers, and imitation leathers. **(No. 660)**

U S I

A sponge rubber substitute can be vulcanized directly to such surfaces as metal and plastics, and has flex-cracking resistance which improves at lower temperatures, it is reported. In many other respects, properties are said to be very similar to those of natural rubber. Material is immediately available for many war applications. **(No. 661)**

U S I

New gaskets made from solution-proof kraft paper are described as suitable for replacements for rubber gaskets in drums, pails, bungs, and spouts. They are said to have been tested for the transportation of all liquids except corrosive acids. **(No. 662)**

U S I

Drying oil substitutes can be produced by fractionation of domestic oils, research work indicates, and commercial production is expected soon. It is reported that the process is adaptable to the making of special fractions for specific purposes. **(No. 663)**

U S I

A suspension agent is reported to aid in preventing the settling or caking of pigments used in luminous paints. It is said that the product can be used in high concentrations to form thick supporting gels. **(No. 664)**

U S I

A lintless filter paper is described as having high retention qualities. Maker says that it is supplied washed with nitric acid, and that it is primarily suitable for the filtering of intravenous and subcutaneous injectibles. **(No. 665)**

U S I

Agitator tanks are now being constructed from wood, including cypress, redwood, pine, fir, oak, and poplar, it has been announced. Storage tanks up to 100,000 gallons capacity are also being produced. The wood tanks are expected to be useful to the processing industries. **(No. 666)**

U S I

Pure nickel foil is now being produced on a small scale in widths up to 16 inches and thicknesses from 0.00025 to 0.0015 inch, it is reported. Possible applications are seen as container linings, diaphragms, and wrappings. **(No. 667)**

U S I

Analytical sets now being supplied include the necessary apparatus and chemicals for the testing of plating solutions. One set is designed for determining total and free sulfuric acid; a second for total and free chromic acid. **(No. 668)**

U S I

Imitation perfume oils developed by one supplier are said to include products that simulate the following natural oils: cassia, bergamot, cinnamon, citronella Java, geranium, lavender, lemongrass, peppermint, and sassafras. **(No. 669)**

U.S.I INDUSTRIAL CHEMICALS, INC.

60 EAST 42ND STREET, NEW YORK — CHEMICALS: INDUSTRIAL, ANTI- — SOLVENTS: ALCOHOLS, FREEZE — USI SERVICE TO INDUSTRY — BRANCHES IN ALL PRINCIPAL CITIES

ALCOHOLS
Amyl Alcohol
Butanol (Normal Butyl Alcohol)
Fusel Oil—Refined

Ethanol (Ethyl Alcohol)
Specially Denatured—All regular and anhydrous formulas
Completely Denatured—all regular and anhydrous formulas
Pure—190 proof, C.P. 96%, Absolute
U.S.I. Denatured Alcohol Anti-freeze
*Super Pyro Anti-freeze
*Solox Proprietary Solvent
*Solox D-I De-icing Fluid

***ANSOLS**
Ansol M
Ansol PR

ACETIC ESTERS
Amyl Acetate
Butyl Acetate
Ethyl Acetate

OXALIC ESTERS
Dibutyl Oxalate
Diethyl Oxalate

PHTHALIC ESTERS
Diamyl Phthalate
Dibutyl Phthalate
Diethyl Phthalate

OTHER ESTERS
*Diatol
Diethyl Carbonate
Ethyl Chloroformate
Ethyl Formate

INTERMEDIATES
Acetoacetanilide
Acetoacet-ortho-anisidide
Acetoacet-ortho-chloranilide
Acetoacet-ortho-toluidide
Acetoacet-para-chloranilide
Ethyl Acetoacetate
Ethyl Benzoylacetate
Ethyl Sodium Oxalacetate

ETHERS
Ethyl Ether
Ethyl Ether Absolute—A.C.S.

OTHER PRODUCTS
Acetone
Collodions
*Curbay B-G
*Curbay Binders
Curbay X (Powder)
Ethylene
Ethylene Glycol
Nitrocellulose Solutions
Potash, Agricultural
Urethan
*Vacatone

*Registered Trade Mark

Industry's Bookshelf

(*Continued from page 213*)

Substitutes, by H. Bennett, Chemical Publishing Company, Inc., New York; 225 pp., $4.00.

Substitutes, replacements, or alternatives are used to reduce costs, to replace unobtainable materials, and to produce better or different properties. As no two materials have all the same properties, the replacement will not yield a finished product possessing exactly the same characteristics as the original. However, if the end performances do not differ too greatly, the substitute is considered satisfactory.

The author, who is Editor-in-Chief of **The Chemical Formulary,** briefly defines and discusses the essential requirements of a substitute, such as hygroscopicity, effect on skin, hair or fingernails, bacterial content, etc. Formulation, proportions, methods of manufacture, costs, use of the finished product, and testing all introduce new problems when a substitute enters the production picture and therefore are considered from the manufacturer's point of view.

Based upon the experience of chemists, engineers, and other technical workers, the principal division of the book lists substitutes and alternatives for chemicals, metals, fibres, and other commercial products. Although it is neither complete nor encyclopedic, this listing is a useful starting point in the present wartime "tight" chemical situation.

Industrial Research, by F. Russell Bichowsky, Chemical Publishing Co., Inc., New York; 126 pp., $2.50. Industrial research is constantly uncovering new sources of national wealth; it is upon these new sources that the economic future of democracy must rest, not on conquest or enslavement. Based upon the personal experience of the author and the accumulated experiences of laboratory executives, the purpose of this book is to display the social importance of research and to outline those general principles of management and organization which have proven successful in the laboratory.

The general discussion of research via the trade association, the consulting laboratory, the small laboratory, and when not to do it offers valuable suggestions particularly to the small company. Successful research laboratories are organized in remarkably similar patterns, and Chapter IX, "Technical Control of the Laboratory," includes an organization chart of a typical laboratory.

FOREIGN LITERATURE DIGEST

By T. E. R. Singer

BOLETIM DO CONSELHO FEDERAL DE COMERCIO EXTERIOR. Vol. V, No. 38 (Rio de Janeiro) (1942), pp. 14-15.

The Alcohol Industry in Brazil: A great deal of interest is being aroused in the manufacture of alcohol, in view of the growing scarcity of motor fuel.

In its meeting of August 3, 1942, the Federal Counsel of Foreign Commerce of Brazil discussed this scarcity and the possibility of using alcohol as a substitute for motor fuel, and made the following resolutions:

a) to promote increase in capacity of existing distilleries;

b) to promote the expansion of the present equipment in these distilleries;

c) to promote the installation of new distilleries;

d) to promote the installation of distilleries for the concentration of brandy at important centers;

e) to recommend to the Institute of Sugar and Alcohol the urgent necessity for installing distilleries in states which do not yet have such plants, and at places considered to be of economic and military strategic importance;

f) to exempt from municipal, state and federal taxes and duties all the brandy intended for the manufacture of industrial alcohol;

g) to prohibit any increase in the manufacture of alcohol for the production of brandy;

h) to encourage the financing of installations or expansions in the industrial alcohol field by the Institute of Sugar and Alcohol, the Bank of Brazil, the Federal Savings Bank and other similar institutions;

i) to guarantee priorities for the importation of the necessary materials and machinery;

j) to have the Institute of Sugar and Alcohol adopt a satisfactory price policy;

k) to expedite a special law authorizing the Institute of Sugar and Alcohol to see that these measures are carried out;

l) to expedite special laws to cover items e, f and h;

m) to encourage the production of all types of alcohol, particularly by the small producer; and

n) to finance all such installations, up to the limit of 100,000 reis, as promptly as possible.

BOLETIM DO CONSELHO FEDERAL DE COMERCIO EXTERIOR, Vol. V, No. 38 (Rio de Janeiro), 1942, pp. 1-4.

Position of Brazilian Cotton in the World Market: In 1941 Brazil held fifth place among the world's producers of cotton, as shown in the table given below. In 1933 cotton exports represented about 1% of Brazil's total exports, whereas in 1941 this figure rose to 15%.

Raw Cotton

World Production in Thousands of Bales

Countries	1 *bale, ks.*	1935-36	1936-37	1937-38	1938-39	1939-40	1940-41
United States	226	10,638	12,399	18,945	11,944	11,816	12,304
India	...	5,824	6,204	5,663	5,120	4,942	4,960
Russia	216	3,012	3,940	4,000	3,890	4,050	3,000
China	226	2,171	3,741	2,803	2,300	2,000	994
Brazil	178	1,883	2,226	2,567	2,505	2,622	2,822
Egypt	340	1,102	1,202	1,210	1,147	1,159	1,900
Korea	226	556	357	625	187	195	198
Peru	226	342	345	424	393	412	340
Uganda	181	321	338	417	302	303	310
Sudan	181	248	333	327	326	290	240
Mexico	216	251	395	345	320	283	270
Asia Minor	216	170	200	277	200	278	218
Argentina	216	372	144	207	304	342	239
Manchuria	226	178	80	75	77	75	...
Belgian Congo	...	75	100	168	194	160	210
Iran	...	160	157	160	160	110	165
Burma	...	105	103	150	105	140	92
French Congo	...	55	65	70	68	65	75
Paraguay	226	46	57	44	43	46	44
Tanganvika territory	181	67	60	44	70	67	54
Colombia	...	35	35	28	25	25	18
Syria and Libano	216	29	35	33	40	39	23
Nigeria	181	60	46	30	22	24	55
Haiti	226	26	26	20	18	21	14
Iraq	...	4	9	20	15	15	17
Indo China	...	14	16	16	16	16	11
Ecuador	...	13	13	19	14	20	10
Rhodesia	181	14	14	18	18	5	1
Kenya	181	16	23	23	13	13	12
Australia	181	17	11	12	16	16	14
Others	...	170	176	180	185	5	322
Total	...	27,830	32,477	38,343	29,963	29,620	28,932

PRICES CURRENT

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1940 Average $1.20 Jan. 1941 $1.16 - Jan. 1943 $0.91

	Current Market	1943 Low	1943 High	1942 Low	1942 High
Acetaldehyde, 99%, 55, 110 gal drs, wks ....lb.	...	.11	...	.11	.11	.11
Acetaldol (Aldol), 55, 110 gal drs, c-l, wks ....lb.	...	.12	...	.12	.12	.12
Acetamide, tech, kgs, wks lb.	...	.28	.28	.50	.28	.50
Acetanilid, tech, cryst, bbls ....lb.	.29	.31	.29	.31	.29	.31
powd, bbls ....lb.	.27	.29	.27	.29	.27	.29
Acetic Anhydride, drs, c-l, frt all'd ....lb.	...	.11½	.11½	.13	.11½	.13
Acetin, tech, lcl drs ....lb.	...	.29	...	.29	.29	.29
Acetone, tks, delv (*PC*) ..lb.	...	.07	...	.07	.07	.158
drs, c-l, delv (*PC*) ....lb.	...	.08½	...	.08½	.08½	.173
Acetonitrile, drs, wks ....lb.	.75	1.00	1.00	2.00	1.00	2.00
Acetophenone, drs ....lb.	1.55	1.60	1.55	1.60	1.55	1.60
Acetophenetidin, bbls, kgs, 1000 lbs ....lb.	...	1.00	...	1.00	1.00	1.00
ACIDS						
Acetic, 28%, bbls (*PC*) 100 lbs.	3.38	3.63	3.38	3.63	3.38	3.63
glacial, nat, bbls ..100 lbs.	9.15	9.40	9.15	9.40	9.15	9.40
synth, drs ....100 lbs.	9.15	9.40	9.15	9.40	9.15	9.40
tks, wks ....100 lbs.	6.25	6.93	6.25	6.93	6.25	6.93
Acetylsalicylic, USP, (*PC*) special, 200 lb bbls ....lb.	...	.45	...	.45	.45	.45
Standard USP ....lb.	...	.40	...	.40	.40	.40
Adipic, fib drs, wks ....lb.	...	.31	...	.31	.31	.31
Anthranilic, ref'd bbls ...lb.	1.20	1.25	1.20	1.25	1.20	1.25
tech, bbls ....lb.	...	.95	...	.95	.95	.95
Ascorbic, bots, drs (*PC*) oz.	1.00	1.07	1.00	1.07	1.00	1.85
Battery, cbys, wks ..100 lbs.	1.60	2.55	1.60	2.55	1.60	2.55
Benzoic, tech, bbls ....lb.	.43	.47	.43	.47	.43	.47
USP, bbls ....lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, frt all'd bgs 40 tons ...ton *a*	...	99.00	...	99.00	99.00	99.00
bbls, c-l, frt all'd ..ton *a*	...	109.00	...	109.00	108.00	109.00
Broenner's, bbls ....lb.	...	1.11	...	1.11	1.11	1.11
Butyric, c-l drs, wks ....lb.	...	.22	...	.22	.22	.22
tks, wks ....lb.	...	.21	...	.21	.21	.21
Caproic, drs, wks ....lb.	...	.35	...	.35	.25	.35
Chlorosulfonic, drs, wks ..lb.	.03	.04½	.03	.04½	.03	.04½
tks, wks ....lb.	...	.02½	...	.02½	.02½	.02½
Chromic, drs (*FP*) ....lb.	.16¼	.18¼	.16¼	.18¼	.16¼	.18¼
Citric, crys, gran, bbls ..lb. *b*	.20	.21	.20	.21	.20	.21
Anhyd gran, drs (*PC*) lb.	.22½	.26½	.22½	.26½	.22½	.26½
Cleve's bbls ....lb.	...	.65	...	.65	.65	.65
Cresylic 50%, 210-215° HB, drs, wks, frt equal (A)gal.	.81	.83	.81	.83	.81	.86
Low Boiling ....gal.	.81	.83	.81	.83	.81	.86
Formic, tech, cbys ....lb.	.10½	.11½	.10½	.11½	.10½	.11½
Fumaric, bbls ....lb.	.27	.31	.27	.31	.27	.31
Gallic, tech, bbls ....lb.	1.05	1.13	1.10	1.12	1.10	1.13
NF bbls ....lb.	1.27	1.30	1.27	1.30	1.27	1.30
H, bbls wks ....lb.	...	.45	...	.45	.45	.45
Hydrochloric, see muriatic						
Hydrocyanic cyls, wks ...lb.	.80	1.00	.80	1.00	.80	1.00
Hydrofluosilic, 35%, bbls lb.	.08	.09	.08	.09	.09	.09½
Hydrofluoric, 30%, bbls, wks ....lb.	...	.06	.06	.06½	.06	.06½
Lactic, 22% dark, bbls ..lb.	.029	.0315	.029	.0315	.029	.035
22%, light, bbls wks ..lb.	.039	.0415	.039	.0415	.039	.0415
44%, dark, bbls wks ..lb.	.063	.0655	.063	.0655	.063	.0655
44%, light, bbls wks ..lb.	.073	.0755	.073	.0755	.073	.0755
Lauric, dist, tech, drs ....lb.	.20	nom.	.20	nom.	.20	.20½
Laurent's bbls ....lb.	...	.45	...	.45	.45	.45
Maleic, powd, drs ....lb.	...	.30	...	.30	.30	.30
Anhydride, drs ....lb.	.25	.26	.25	.26	.25	.26
Malic, powd, kgs ....lb.	...	.47	...	.47	.47	.47
Mixed tks N unit ....lb.	.05	.06	.05	.06	.05	.06
S unit ....lb.	.0085	.009	.0085	.009	.0085	.009
Molybdic, kgs, wks ....lb.	.95	1.10	.95	1.10	.95	1.10
Monochloracetic, tech, bbls ....lb.	...	.17	...	.17	.17	.17
Monosulfonic, bbls ....lb.	...	1.50	...	1.50	1.50	1.50
Muriatic, 18° cbys, c-l wks ....100 lb.	...	1.50	...	1.50	1.50	1.50
tks, wks ....100 lb.	...	1.05	...	1.05	1.05	1.05
20° cbys, c-l, wks ..100 lb.	...	1.75	...	1.75	1.75	1.75
tks, wks ....100 lb.	...	1.15	...	1.15	1.15	1.15
22° cbys, c-l, wks ..100 lb.	...	2.25	...	2.25	2.25	2.25
tks, wks ....100 lb.	...	1.65	...	1.65	1.65	1.65
CP cbys ....lb.	.06½	.08	.06½	.08	.06½	.08
Myristic, dist, drs ....lb.	.19	.19½	.19	.19½	.18	.19½
Naphthenic drs, 220-230 ..lb.	.13	.14	.13	.14	.10	.14
tks, wks (A) ....lb.	.10	.13	.10	.13	.09	.13

a Powdered boric acid $5 a ton higher; USP $25 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices; *y* Price given is per gal.

(*A*) Allocation. (*FP*) Under full priority control. (*PC*) Under price ceiling.

	Current Market	1943 Low	1943 High	1942 Low	1942 High
Acids (continued):					
Naphthionic, tech, bbls ..lb.	.60	.65	.60	.65	.60	.65
Nicotinic fib-dms (Niacin) lb.	5.00	5.30	5.00	5.50	5.00	7.15
Nitric, 36°, cbys, c-l, wks ....100 lbs. *c*	...	5.00	...	5.00	5.00	5.00
38°, c-l, cbys, wks 100 lbs. *c*	...	5.50	...	5.50	5.50	5.50
40°, c-l, cbys, wks 100 lbs. *c*	...	6.00	...	6.00	6.00	6.00
42°, c-l, cbys, wks 100 lbs. *c*	...	6.50	...	6.50	6.50	6.50
CP, cbys ....lb.	.11½	.13	.11½	.13	.11½	.13
Oxalic, bbls, wks (*PC*) ..lb.	.11¼	.12½	.11¼	.12½	.11¼	.14½
Phosphoric, 75% USP, cbys ....lb.	.10½	.13	...	.12	.12	.12
50% food grade, c-l, bbls, wks, frt equal ..100 lbs.	4.00	4.25	4.00	4.25	4.00	4.25
Picramic, kgs ....lb.	.65	.70	.65	.70	.65	.70
Picric, bbls, wks ....lb.	...	.35	...	.35	.35	.35
Propionic, pure, drs, wks lb.	...	.15	...	.14	.14	.14
tks, wks ....lb.	...	.14	...	.11	.11	.11
Pyrogallic, tech, lump, pwd, bbls ....lb.	...	1.45	...	1.45	1.45	1.45
USP, cryst, dms ....lb.	2.10	2.15	2.10	2.15	2.10	2.15
Pyroligneous, bbls, delv gal.	...	.25	...	.25	.25	.25
Ricinoleic, tech, drs, wks lb.	.32	.37	.32	.37	.32	.37
Salicylic, tech, 125 lb bbls, wks (*PC*) ....lb.	...	.33	...	.33	...	.33
USP, bbls ....lb.	.35	.40	.35	.46	.35	.46
Sebasic, tech, bbls, wks ..lb.	.65	.69	.65	.69	.65	.82
Stearic, see under Oils & Fats						
Succinic, bbls ....lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb drs, wks lb.	...	.17	...	.17	...	.17
Sulfuric, 60°, tks, wks ..ton	...	13.00	...	13.00	...	13.00
c-l, cbys, wks ....100 lb.	...	1.25	...	1.25	...	1.25
66°, tks, wks ....ton	...	16.50	...	16.50	...	16.50
c-l, cbys, wks ....100 lb.	...	1.50	...	1.50	...	1.50
CP, cbys, wks ....lb.	.06½	.08	.06½	.08	.06½	.08
Fuming (Oleum) 20% tks. wks ....ton	...	19.50	...	19.50	...	19.50
Tannic, tech, 300 lb bbls lb.	.71	.73	.71	.73	.71	.73
Tartaric, USP, gran, powd, 300 lb bbls ....lb.	...	.70½	...	.70½	...	.70½
Tobias, 250 lb bbls ....lb.	.55	.60	.55	.60	.55	.60
Trichloroacetic bottles ...lb.	2.00	2.50	2.00	2.50	2.00	2.50
Tungstic, pure 100 lb. pkg. (A) ....lb.	...	2.86	...	2.86	...	2.86
Acrylonitrile, tks (A) ...lb.	...	.39	...	.39	.34	.39
Albumen, light flake, 225 lb bbls ....lb.	.65	.70	.65	.70	.65	.75
soluble, bbls ....lb.	...	.13½	...	.13½	.12½	.14
egg, edible ....lb.	1.75	1.76	1.75	1.76	1.73	1.85
Alcohol, Amyl (from Pentane) tks, delv ....lb.	...	.131	...	.131	...	.131
c-l, drs, delv ....lb.	...	.141	...	.141	...	.141
lcl, drs, delv ....lb.	...	.151	...	.151	...	.151
Amyl, normal lcl drs Wyandotte, Mich ...lb.	...	.27	...	.27	.25	.27
secondary, tks, delv ....lb.						
drs, c-l, delv E of Miss ....lb.	...	.09½	...	.09½	...	.09½
tertiary, rfd, lcl, drs, f.o.b., E of Miss, frt all'd ....lb.	...	.09	...	.09	...	.09
Benzyl, cans ....lb.	.65	.75	.65	.75	.65	.75
Butyl, normal, tks, f.o.b. wks, frt all'd (*PC*) (A) ....lb.	.10¾	.14¼	.10¾	.14¼	.10¾	.168
c-l, drs, f.o.b. wks, frt all'd ....lb.	.11¾	.15¼	.11¾	.15¼	.11¾	.173
Butyl, secondary, tks, delv ....lb.	...	.08½	...	.08½	...	.08½
c-l, drs, delv ....lb.	...	.091	...	.09½	...	.09½
Butyl, tert denat c-l drs lb.	...	.12½	...	.12½	...	.12½
lcl drs ....lb.	...	.13	...	.13	...	.13
tks ....lb.	...	.11	...	.11½	...	.11½
Capryl, drs, crude, wks lb.	...	.16	...	.16	...	.16
Cinnamic, bottles ....lb.	3.00	3.60	3.00	3.60	3.00	3.60
Denatured, CD, 14, c-l drs, wks (*PC, FP*) gal.	...	.65	...	.65	...	.65
tks, East, wks ....gal.	...	.58	...	.58	...	.58
Denatured, SD, No. 1, tks.	...	.53	...	.53	...	.53
Diacetone, pure, c-l drs, delv ....lb. *f*	.11½	.14½	.11¾	.15	.11½	.15
tks, delv ....lb.	.10½	.13½	.10½	.13½	.10½	.13½
tech, contract, drs, c-l, delv ....lb.	.11	.13½	.11	.13½	.11	.13½
tks, delv ....lb.	.10	.12½	.10	.12½	.10	.14

c Yellow grades 25c per 100 lbs. less in each case. *d* Prices given are Eastern schedule; Territories other east of Rockies and 15½c per gal. less than Eastern Works price.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

For all industrial and research purposes

THREE important properties—purity, uniformity, freshness—characterize *Kodak Hydroquinone*. It is held to rigid purity standards by the stringency of photographic requirements . . . years of manufacturing experience contribute to its uniformity . . . continuous production assures its freshness. *Kodak Hydroquinone* is recommended for all industrial and research purposes. Quotations will be furnished promptly upon request. Eastman Kodak Company, *Chemical Sales Division*, Rochester, N. Y.

KODAK Hydroquinone

Chemically Pure

TESTED EK CHEMICALS

USE A *Cowles* DETERGENT SILICATE

DRYMET—Anhydrous Sodium Metasilicate
Reg. U. S. Pat. Off.

Cowles DRYMET is the most highly concentrated, most economical form of sodium metasilicate available. DRYMET contains no water. Yields nearly twice the chemical strength of hydrated sodium metasilicate at a substantial saving. Completely soluble, non-caking, easy to handle.

CRYSTAMET—Pentahydrate Sodium Metasilicate
Reg. U. S. Pat. Off.

Cowles CRYSTAMET is an exceptionally pure, perfectly white granular sodium metasilicate with the normal 42% water of crystallization. Excellent solubility, uniformity, chemical stability.

DRYORTH—Technically Anhydrous Sodium Orthosilicate
Reg. U. S. Pat. Off.

Cowles DRYORTH is a high pH detergent silicate with valuable peptizing, emulsifying, dirt-suspending power. Recommended for heavy duty detergency requiring high Na_2O value.

THE COWLES DETERGENT COMPANY
7016 EUCLID AVENUE ★ CLEVELAND, OHIO
Heavy Chemical Department

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Alcohols (continued):						
Ethyl, 190 proof molasses, tks	gal	g		11.92	8.12	11.92
c-l, drs	gal	g		11.99		12.02½
c-l, bbls	gal	g		12.03		12.06½
Furfuryl, tech, 500 lb drs	lb.	.20	.35	.20	.35	.20	.35
Hexyl, secondary tks, delv	lb.		.23		.23		.23
c-l, drs, delv	lb.		.24		.24		.24
Isoamyl, prim, cans, wks	lb.		.32		.32		.32
drs, lcl, delv	lb.		.22½		.22½		.22½
Isobutyl, ref'd, lcl, drs	lb.		.086		.086		.086
c-l, drs	lb.		.076		.076		.076
tks	lb.		.076		.076		.076
Ethylhexyl, tks, wks	lb.		.23	.23	.25	.23	.25
Isopropyl, ref'd, 91% drs, frt all'd	gal.	.39	.43½	.39	.43½	.40½	.43½
tks, frt all'd	gal.		.34		.34	.34	.34
99%, drs, frt all'd	gal.	.44	.47	.44	.47	.44	.47
tks, frt all'd	gal.		.37½		.37½	.37½	.37½
Octyl, see Ethylhexyl							
Polyvinyl A fib drs	lb.	.65	.70		.65	.54	.65
B fib drs	lb.	.60	.65	.60	.65	.60	.70
Propyl, nor, drs, wks	gal.	.67	.70	.67	.70	.69	.75
Spec Solvents, East, drs, wks	gal.		.61		.61	.61	.70
tks, East, wks	gal.		.54		.54	.54	.66
Tetrahydrofurfuryl drs, f.o.b. wks	lb.	.44	.50	.44	.50	.44	.50
Aldehyde ammonia, 100 gal drs	lb.	.65	.70	.65	.70	.65	.70
Aldehyde Bisulfite, bbls, delv	lb.		.17		.17		.17
Aldol, 95%, 55 and 110 gal, drs, delv	lb.	.12	.13	.12	.15	.12	.15
Alphanaphthol, crude, 300 lb bbls	lb.		.52		.52		.52
Alphanaphthylamine, 350 lb bbls	lb.		.32		.32		.32
Alum, ammonia, lump, c-l, bbls, wks	100 lb		4.25		4.25		4.25
delv NY, Phila	100 lb.		4.25		4.25		4.25
Granular, c-l, bbls, wks	100 lb.		4.00		4.00		4.00
Powd, c-l, bbls, wks	100 lb.		4.40		4.40		4.40
Potash, lump, c-l, bbls, wks	100 lb.		4.50		4.50		4.50
Granular, c-l, bbls, wks	100 lb.		4.25		4.25		4.25
Powd, c-l, bbls, wks	100 lb.		4.65		4.65		4.65
Soda, bbls, wks	100 lb.		3.25		3.25		3.25
Chrome, bbls	100 lb.	.12½	.15	.12½	.15	.12½	.15
Aluminum metal, c-l, (FP)	100 lb.	15.00	16.00	15.00	16.00	15.00	16.00
Acetate, 20%, nor sol, bbls	lb.	.09½	.10½	.09½	.10½	.09½	.11
Basic powd, bbls, delv	lb.	.40	.50	.40	.50	.40	.50
24% sol, bbls, delv	lb.	.10½	.11	.10½	.11	.10½	.11
Chloride anhyd 99% wks	lb.	.08	.12	.08	.12	.08	.12
Crystals, c-l, drs, wks	lb.	.06	.06¾	.06	.06½	.06	.06½
Solution, drs, wks	lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03¼
Formate, 30% sol bbls, c-l, delv	lb.	.13	.15	.13	.15	.13	.15
Hydrate, 96%, light, 90 lb. bbls, delv (A)	lb.		.15		.14½		.14½
heavy, bbls, wks	lb.		.034		.034		.034
Oleate, drs	lb.		.24½		.24½	.17½	.26
Palmitate, bbls	lb.	.25	.26	.25	.26	.25	.26
Resinate, pp., bbls	lb.		.15½		.15½	.15	.15½
Stearate, 100 lb bbls	lb.	.23	.24	.23	.24	.22	.24
Sulfate, com, c-l, bgs, wks	100 lb.	1.15	1.25	1.15	1.25	1.15	1.25
c-l, bbls, wks	100 lb.	1.35	1.45	1.35	1.45	1.35	1.45
Sulfate, iron-free, c-l, bgs, wks	100 lb.	1.75	1.85	1.75	1.85	1.75	1.85
c-l, bbls, wks	100 lb.	1.95	2.05	1.95	2.05	1.95	2.05
Ammonia anhyd fert com, tks	lb.	.04½	.05	.04½	.05	.04½	.05
Ammonia anhyd, 100 lb cyl	lb.		.16		.16		.16
26°, 800 lb drs, delv	lb.	.02¼	.02½	.02¼	.02½	.02¼	.02½
Aqua 26°, tks, NH_3 cont.			.04		.04	.04	.08z
Ammonium Acetate, kgs	lb.	.27	.33	.27	.33	.27	.33
Bicarbonate, bbls, f.o.b. wks	100 lb.	.0564	.0614	.0564	.0614	.0564	.0614
Bifluoride, 300 lb bbls	lb.	.16	.18	.16	.18	.15½	.18
Carbonate, tech, 500 lb bbls	lb.	.08¼	.09¼	.08¼	.09¼	.08¼	.09¼
Chloride, White, 100 lb. bbls, wks, c-l	100 lb.		4.45		4.45	4.45	
Gray, 250 lb bbls, wks, c-l	100 lb.	5.50	5.75	5.50	5.75	5.50	5.75
Lactate, 500 lb bbls	lb.	.16	.16	.15	.16	.15	.16
Laurate, bbls	lb.		.23		.23		.23
Linoleate, 80% anhyd, bbls	lb.		.12		.12		.12
Nitrate, tech, bgs, bbls	lb.	.0435	.0455	.0435	.0455	.0435	.0455
Oleate, drs	lb.		.14		.14		.14
Oxalate, neut, cryst, powd, bbls	lb.	.23	.29	.23	.29	.23	.29
Perchlorate, kgs (A)	lb.	.55	.65	.55	.65	.55	.65
Persulfate, 112 lb kgs	lb.	.25½	.28½	.25½	.28½	.21	.28½
Phosphate, dibasic tech, powd, 325 lb bbls	lb.		.07¼		.07¼	.09¼	.09¼
Ricinoleate, bbls	lb.		.15		.15		.15
Stearate, anhyd, bbls	lb.		.24½		.24½		.24½
Paste, bbls	lb.		.06½		.06½		.06½
Sulfate, dom, f.o.b., bulk (A)	ton	28.20	29.20	29.00	30.00	29.00	30.00

z On a f.o.b. wks. basis.
(A) Allocation.

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Ammonium (continued):						
Sulfocyanide, pure, kgs	lb.	.45	.55	.45	.55	.45	.55
Amyl Acetate (from pentane)							
tks, delv	lb.		.145		.145		.145
c-l, drs, delv	lb.		.155		.155		.155
lcl, drs, delv	lb.		.165		.165		.165
tech drs, ex-fusel oil delv	lb.	.13	.18	.13	.18	.14½	.18
Secondary, tks, delv	lb.		.08½		.08½		.08½
c-l, drs, delv	lb.		.09½		.09½		.09½
tks, delv	lb.		.08½		.08½		.08½
Chloride, norm, drs, wks	lb.	no prices		no prices		.56	.68
mixed lcl drs, wks	lb.		.08		.08		.08
tks, wks	lb.		.06		.06		.06
Amyl Ether (see Diamyl)							
lcl, drs	lb.		.102		.102		.102
cl, drs	lb.		.095		.095		.095
tks	lb.		.085		.085		.085
Mercaptan, drs, wks	lb.		1.10		1.10		1.10
Oleate, lcl, wks, drs	lb.		.31		.31		.31
Stearate, lcl, wks, drs	lb.		.32½		.32½		.32½
Amylene, c-l, drs, f.o.b. wks	lb.		.10½		.10½	.102	.11
lcl, drs, f.o.b., wks			.11		.11		.11
tks, f.o.b., wks	lb.		.09		.09		.09
Amylnaphthalenes, see Mixed Amylnaphthalenes							
Aniline Oil, 960 lb drs and tks	lb.	.12½	.16	.12½	.16	.12½	.16
Annatto paste	lb.	.34	.39	.34	.39	.34	.39
Anthracene, 80-85%	lb.		.55		.55		.55
Anthraquinone, sublimed, 125 lb bbls	lb.		.70		.70		.70
Antimony metal slabs, ton lots	lb.		.14½		.14½	.14	.14½
Butter of, see Chloride							
Chloride, soln, cbys	lb.		.17		.17		.17
Needle, powd, bbls	lb.	.18½	.20	.18½	.20	.18½	.20
Oxide, 500 lb bbls (A)	lb.	.15	.15½	.15	.15½	.15	.16½
Salt, 63% to 65%, drs	lb.		.40		.40	.34	.40
Archil, conc, 600 lb bbls	lb.		.26		.26		.26
Aroclors, wks	lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbls	lb.	.10	.10½	.09½	.09¾	.09½	.10¾
Arsenic, Metal	lb.	no prices		no prices		no prices	
Red, 224 lb cs kgs	lb.	no prices		no prices		no prices	
White, 112 lb kgs (A)	lb.	.04	.04¾	.04	.04¾	.04	.04¾
B							
Barium Carbonate precip, 200 lb bgs, wks	ton	55.00	65.00	55.00	65.00	55.00	65.00
Nat (witherite) 90% gr, c-l, wks, bgs	ton		43.00		43.00		43.00
Chlorate, 112 lb kgs, NY (A)	lb.		.36		.60		.60
Chloride, 600 lb bbls, delv, zone 1	ton	77.00	92.00	77.00	92.00	77.00	92.00
Dioxide, 88%, 690 lb drs	lb.	.10	.18		.10		.10
Hydrate, 500 lb bbls	lb.	.06	.07	.06	.07	.06	.07
Nitrate, bbls	lb.	.11	.12	.11	.12	.10½	.12½
Barytes, floated, 350 lb bbls c-l, wks	ton		27.65		27.65		27.65
Bauxite, bulk mines (A)	ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, 325 mesh, bgs, wks	ton		16.00		16.00		16.00
200 mesh	ton		11.00		11.00		11.00
Benzaldehyde, tech, 945 lb. drs, wks	lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, Ind. 8000 gal tks, ft all'd	gal.	(A)	.15	(A)	.15		.15
90% c-l, drs	gal.		.20		.20		.20
Ind pure, tks, frt all'd	gal.		.15		.15		.15
Benzidine Base, dry, 250 lb. bbls	lb.		.70		.70		.70
Benzoyl Chloride, 500 lb drs	lb.	.22	.24	.23	.28	.23	.28
Benzyl Chloride, 95-97% rfd. drs	lb.	.22	.24	.22	.24	.22	.24
Beta-Naphthol, 250 lb bbls, wks	lb.	.23	.24	.23	.24	.23	.24
Naphthylamine, sublimed, 200 lb bbls	lb.		1.25		1.25	1.25	
Tech, 200 lb bbls	lb.		.51		.51		.51
Bismuth metal	lb.		1.25		1.25		1.25
Chloride, boxes	lb.		3.00		3.00		3.00
Hydroxide	lb.	3.35	3.46	3.35	3.46	3.35	3.46
Oxychloride	lb.	3.10	3.19	3.10	3.19	3.10	3.19
Subbenzoate, fib drs	lb.		3.40		3.40		3.40
Subcarbonate, 175 lb bbls	lb.		1.50	1.59	1.85	1.59	1.85
Subnitrate, fibre, drs	lb.	1.20	1.23	1.29	1.33	1.29	1.57
Trioxide, powd, boxes	lb.		3.65		3.65		3.65
Blanc Fixe, Pulp, 400 lb bbls, wks	ton	h	40.00	46.50	40.00	46.50	40.00	46.50
Bleaching Powder, 800 lb drs, c-l, wks, contract	100 lb.		2.50	3.10	2.25	3.10	2.25	3.10
lcl, drs, wks	lb.		2.75	3.60	2.50	3.35	2.50	3.35
Blood, dried, f.o.b., NY unit				4.95		4.95	5.25	5.75
Chicago, high grade	unit			5.38		5.38	5.40	5.90
Imported shipt	unit			nom.		nom.	5.00	5.50
Blues, Chinese								
Prussian Soluble	lb.			.36		.36		.36
Milori, bbls	lb.			.36		.36		.36
Ultramarine,* dry, wks, bbls	lb.		.12	.13	.12	.13	.11	.13
Regular grade, group 1	lb.		.17	.27	.17	.27	.16	.27
Pulp, Cobalt grade	lb.		.23	.27	.23	.27	.22	.27
Bone, 4½ + 50% raw, Chicago	ton			39.50		39.50	39.00	40.00
Bone Ash, 100 lb kgs	lb.		.06	.07	.06	.07	.06	.07

h Lowest price is for pulp; highest for high grade precipitated; i Crystals $6 per ton higher; USP, $15 higher in each case; * Freight is equalized in each case with nearest producing point.

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NEW YORK, N.Y.
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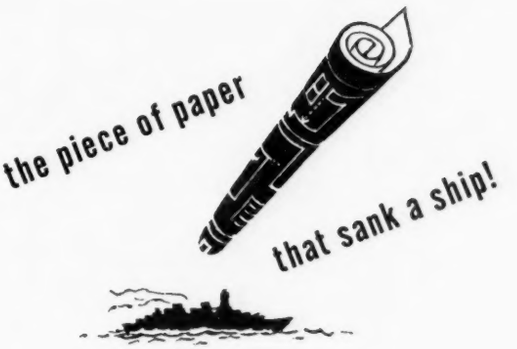
UREA PEROXIDE

AND OTHER ORGANIC AND INORGANIC PERCOMPOUNDS

Buffalo Electro-Chemical Company, Inc.
BUFFALO, NEW YORK



It started as a few hentracks on a sheet of paper — it ended in a burst of glory in the dead center of an axis ship. Like all America's highly effective weapons it began as a dream translated into drawings and figures. And like so many of America's inventions for both war and peace, it began as a blueprint paper produced with . . . . . .

HUNT'S POTASSIUM FERRICYANIDE

(Red Prussiate of Potash)

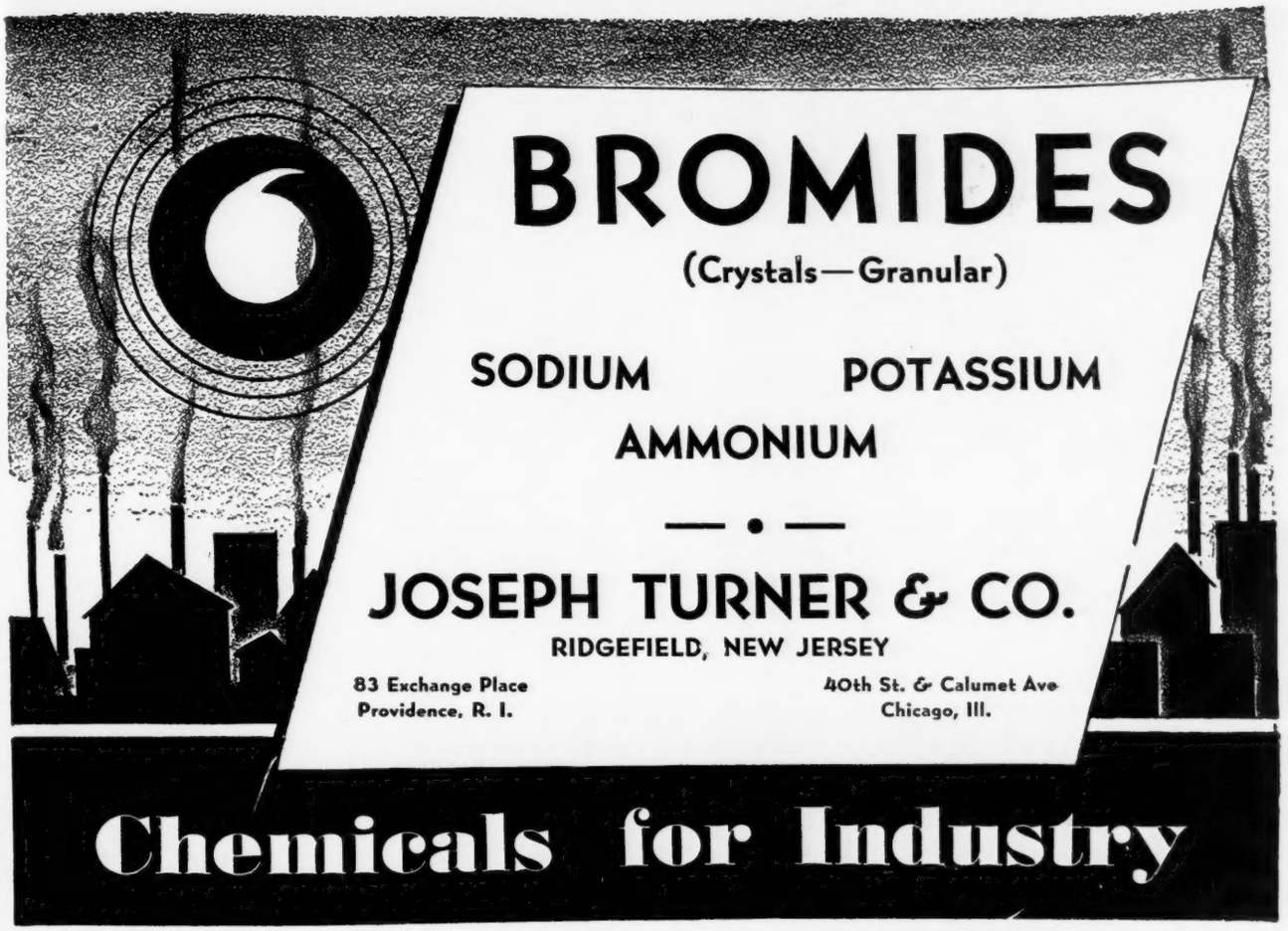
Manufactured by
HUNT CHEMICAL WORKS, inc.
271 Russell Street, Brooklyn, N. Y.

	Current Market	1943 Low	1943 High	1942 Low	1942 High
Bone Ash (continued):					
Meal, 3% & 50% imp ton	...	37.50	...	37.50	...	37.50
Domestic, bgs, Chicago ton	38.00	40.00	38.00	40.00	38.00	40.00
Borax, tech, gran, 80 and 40 ton lots, bgs, delv . ton	...	45.00	...	46.00	45.00	46.00
bbls, delv (*FP*) ... ton	...	55.00	...	55.00	54.00	55.00
Tech, powd, 80 and 40 ton lots, bgs ..... ton	...	50.00	...	51.00	50.00	51.00
bbls, delv ..... ton	...	60.00	...	60.00	59.00	60.00
Bordeaux Mixture, drs . lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases ..... lb.	.25	.30	.25	.30	.25	.30
Bronze, Al, pwd, 300 lb drs (*FP*) ..... lb.	...	.59	...	.59	...	.59
Gold, blk ..... lb.	.60	.65	.60	.65	.60	.65
Butanes, com 16-32° group 3 tks (*PC*) ..... lb.	.03	.03½	.02½	.03½	.02½	.03½
Butyl, acetate, norm drs, frt all'd ..... lb	.124	.1575	.124	.1575	.124	.168
tks, frt all'd ..... lb.	.1115	.1475	.1115	.1475	.1115	.158
Secondary, tks, frt all'd lb.	...	.08½	...	.08½	...	.08½
drs, frt all'd ..... lb.	...	.09½	...	.09½	...	.09½
Aldehyde, 50 gal drs, wks ..... lb.	.14½	.16½	.14½	.16½	.14½	.17½
Carbinol, norm (see Normal Amyl Alcohol)						
Chloride, normal lcl, drs ..... lb.	...	.35	...	.35	.28	.35
c-l, drs ..... lb.	...	.32	...	.32	.25	.32
Crotonate, norm, 55 and 110 gal drs, delv ... lb.	...	.35	...	.35	...	.35
Lactate ..... lb.	...	.26½	...	.26½	...	.26½
Oleate, drs, frt all'd .. lb.	.29	.35	...	.35	.25	.35
Propionate, drs ..... lb.	.16½	.17	.16½	.17	.16½	.17
tks, delv ..... lb.	...	.15½	...	.15½	.15½	.35
Stearate, 50 gal drs ... lb.	...	.31	...	.31	...	.31
Tartrate, drs ..... lb.	no prices		no prices		no prices	
Butyraldehyde, drs, lcl, wks lb	...	.35½	...	.35½	...	.35½
C						
Cadmium Metal (*PC*) ...lb.	.90	.95	.90	.95	.90	.95
Sulfide, orange, boxes . lb.	...	1.10	...	1.10	...	1.10
Calcium, Acetate, 150 lb bgs c-l, delv ..... 100 lb.	3.00	4.00	3.00	4.00	3.00	4.00
Arsenate, c-l, E of Rockies, dealers, drs ..... lb.	.07	.08	.07	.08	.06½	.08
Carbide, drs (A) ..... lb.	...	.04¾	...	.04¾	...	.04¾
Carbonate, tech, 100 lb bgs, c-l ..... ton	18.00	22.00	16.00	20.00	16.00	20.00
Chloride, flake, 375 lb drs, paper bgs, l-c-l, delv ton	21.50	25.50	...	21.00	...	21.00
paper bgs, c-l, delv ..ton	18.50	35.00	18.50	41.00	18.50	41.00
Solid, 650 lb drs, c-l, delv ..... ton	18.00	31.50	18.00	34.50	18.00	34.50
Ferrocyanide, 350 lb bbls wks ..... lb.	...	.20	...	.20	...	.20
Gluconate, Pharm, 125 lb. bbls, drs ..... lb.	.52	.59	.52	.59	.52	.59
Levulinate, less than 25 bbl lots, wks ..... lb.	...	3.00	...	3.00	...	3.00
Nitrate, 100 lb bgs ...ton	no prices		no prices		no prices	
Palmitate, bbls ..... lb.	.28	.29	.28	.29	.28	.29
Phosphate, tribasic, tech, 450 lb bbls ..... lb.	.0635	.0785	.0635	.0705	.0635	.0705
Resinate, precip, bbls .. lb.	.15	.16	.15	.16	.13	.16
Stearate, 100 lb bbls .. lb.	.25	.28	.26	.27	.26	.27
Camphor, slabs ..... lb.	.95	nom.	1.60	1.65	1.60	1.65
Powder ..... lb.	.95	nom.	1.60	1.65	1.60	1.65
Carbon Bisulfide, 500 lb drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Black, c-l, bgs, f.o.b. plants ..... lb.	...	.03625	...	.03625	...	.03625
Decolorizing, drs, c-l .. lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq, 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, (*FP*) (*PC*) 55 or 110 gal drs, c-l, delv ..... lb.	.73	.80	...	.83	.73	.83
Casein, Standard, Dom, grd lb.	.19	.21	.19	.21	.15	.30½
80-100 mesh, c-l bgs ...lb.	.19½	.21½	.19½	.21½	.15½	.31
Castor Pomace, 5½ NH_3, c-l, bgs, wks (*PC*) ..... ton	...	19.00	...	19.00	16.00	19.00
Imported, ship, bgs ...ton	no prices		no prices		no prices	
Celluloid, Scraps, ivory cs lb.	...	.13	.13	.15	.13	.15
Transparent, cs ..... lb.	...	.20	...	.20	...	.20
Cellulose, Acetate, frt all'd, 50 lb kgs ..... lb.	.30	.35	.30	.35	.30	.35
Triacetate, flake, frt all'd ..... lb.	...	.30	...	.30	...	.30
Chalk, dropped, 175 lb bbls lb.	...	.02⅞	...	.02⅞	...	.02⅞
Precip, heavy, 560 lb cks ..... 100 lbs.	...	32.50	...	32.50	32.50	32.50
Charcoal, Hardwood, lump, blk, wks ..... bu.	...	.15	...	.15	...	.15
Softwood, bgs, delv* ...ton	32.50	35.80	27.50	38.50	25.00	38.50
Willow, powd, 100 lb bbls, wks ..... lb.	.06	.07	.06	.07	.06	.07
Chestnut, clarified tks, wks lb	...	.0225	...	.0225	...	.0225
25%, bbls, wks ..... lb.	...	.0275	...	.0275	...	.0275
China Clay, c-l, blk mines ton	...	7.60	...	7.60	...	7.60
Imported, lump, blk ...ton	19.00	24.00	19.00	24.00	18.60	24.00
Chlorine, cyls, lcl, wks, contract (*FP*) (A) .... lb.	...	.07¼	...	.07¼	...	.07¼
cyls, c-l, contract . lb. *j*	...	.05¼	...	.05¼	...	.05¼
Liq, tk, wks, contract 100 lb.	...	1.75	...	1.75	...	1.75
Multi, c-l, cyls, wks, cont ..... lb.	...	2.00	...	2.00	...	2.00
Chloroacetophenone, tins, wks ..... lb.	3.00	3.50	3.00	3.50	3.00	3.50

j A delivered price; * Depends upon point of delivery.
(*FP*) Full Priority. (*PC*) Price Ceiling.
(A) Allocation.

	Current Market	1943 Low	1943 High	1942 Low	1942 High
Chlorobenzene, Mono, 100 lb. drs, lcl, wks ..... lb.	...	.08	...	.08	...	.08
Chloroform, tech, 650 lb drs ..... lb.	...	.20	...	.20	...	.20
USP, 650 lb drs ..... lb.	...	.30	...	.30	...	.30
Chloropicrin, comml cyls . lb.	...	.80	...	.80	...	.80
Chrome, Green, CP ..... lb.	.23	.33	.23	.33	.23	.33
Yellow ..... lb	...	.16	.16	.17	.16	.17
Chromium Acetate, 8% Chrome, bbls ..... lb.	...	.07½	...	.07½	.07½	.08½
Fluoride, powd, 400 lb bbls ..... lb.	.27	.28	.27	.28	.27	.28
Coal tar, bbls ..... bbl.	8.25	9.25	8.25	9.25	7.50	9.25
Cobalt Acetate, bbls (A) lb.	...	.83¾	...	.83¾	...	.83¾
Carbonate tech, bbls (A) lb.	...	1.58	...	1.58	...	1.58
Hydrate, bbls (A) .... lb.	...	2.04	...	2.04	...	2.04
Linoleate, solid, bbls .. lb.	...	.44	...	.44	.42	.44
paste, 5%, drs ..... lb.	.32	.35	.32	.35	.31	.35
Oxide, black, bgs (A) . lb.	...	1.84	...	1.84	...	1.84
Resinate, fused, bbls . lb.	...	.15	...	.15	.13½	.15
Precipitated, bbls ... lb.	...	.38	...	.38	.34	.38
Cochineal, gray or bk bgs lb.	.37	.38	.37	.38	.37	.38
Teneriffe silver, bgs ...lb.	.38	.39	.38	.39	.38	.39
Copper, metal *FP*, *PC* 100 lb.	12.00	12.50	12.00	12.50	12.00	12.50
Acetate, normal, bbls, delv ..... lb.	...	.24	.24	.26	.24	.26
Carbonate, 52-54% 400 lb bbls ..... lb	.19½	.20	.18	.20½	.18	.20½
Chloride, 250 lb bbls (A) anhyd ..... lb.	.23¼	.24	...	.23¼	.19½	.23¼
Cyanide, 100 lb drs ...lb.	.34	.38	.34	.38	.34	.38
Oleate, precip, bbls ... lb.	.22	.29½	.22	.29½	.20	.29½
Oxide, black, bbls, wks lb.	.19½	.21	.19½	.21	.19½	.21
red 100 lb bbls ..... lb.	.20	.22	.20	.22	.20	.22
Sub-acetate verdigris, 400 lb bls ..... lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks (A) ..... 100 lb.	5.15	5.30	5.15	5.50	5.15	5.50
Copperas crys and sugar bulk c-l, wks ..... ton	...	17.00	...	17.00	...	17.00
Corn sugar, tanners, bbls 100 lb.	...	3.54	...	3.54	3.54	4.05
Corn Syrup, 42°, bbls 100 lb.	...	3.69	...	3.69	3.52	3.69
43°, bbls ..... 100 lb.	...	3.74	...	3.74	3.57	3.74
Cotton, Soluble, wet 100 lb bbls ..... lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, powd & gran 300 lb bbls ..... lb.	...	.57½	...	.57½	...	.57½
Creosote, USP 42 lb cbys lb.	.60	.77	.60	.77	.60	.77
Oil, Grade 1 tks .....gal.	...	.15½	...	.15½	...	.15½
Grade 2 ..... gal.	.122	.132	.122	.132	.122	.132
Cresol, USP, drs, c-l (A) lb	.10¾	.11¼	.10¾	.11¼	.10¾	.11½
Crotonaldehyde, 97%, 55 and 110 gal drs, wks ....lb.	...	.15	...	.15	...	.15
Cutch, Philippine, 100 lb bale lb.	no supplies		no supplies		...	.05¼
Cyanamid, pulv, bgs, c-l, frt (A) all'd, nitrogen basis, unit ..... unit ton	...	1.52½	1.62½	...	no prices	
D						
Derris root 5% rotenone, bbls ..... lb.	...	.35	...	.35	.40	.45
Dextrin, corn, 140 lb bgs f.o.b., Chicago ...100 lb.	...	4.00	...	4.00	...	4.00
British Gum, bgs ...100 lb.	...	4.25	...	4.25	...	4.25
Potato, Yellow, 220 lb bgs lb.	...	.10	...	.10	.09½	.10
White, 220 lb bgs, lcl lb.	.10¼	.11¾	.09½	.11¾	.09½	.11¾
Tapioca, 200 bgs, lcl .. lb.	...	.0715	...	.0715	...	.0715
White, 140 lb bgs ..100 lb.	...	3.95	...	3.95	...	3.95
Diamylamine, c-l, drs, wks lb.	...	.61	...	.61	.50	.61
lcl, drs, wks ..... lb.	...	.64	...	.64	.53	.64
Diamylene, drs, wks ..... lb.	...	.105	...	.105	...	.105
lcl, drs ..... lb	...	.112	...	.112	...	.112
tks, wks ..... lb.	...	.09½	...	.09½	...	.09½
Diamylether ..... lb.	...	...	...	...	...	...
lcl, drs ..... lb.	...	.112	...	.112	.102	.112
c-l, drs ..... lb.	...	.105	...	.105	.095	.105
tks ..... lb.	...	.095	...	.095	.085	.095
Diamylnaphthalene, lcl, drs, f.o.b. wks ..... lb.	...	.17	...	.17	...	.17
Diamylphenol, lcl, drs ...lb.	...	.21	...	.21	...	.21
Diamylphthalate, drs, wks lb.	...	.22	...	.22	.21	.22
Diamyl Sulfide, drs, lcl ..lb.	...	.25	...	.25	...	.25
Diatomaceous Earth, see Kieselguhr.						
Dibutoxy Ethyl Phthalate, drs, wks ..... lb.	...	.35	...	.35	...	.35
Dibutylamine, lcl, drs, wks lb.	...	.64	...	.64	.53	.64
c-l, drs, wks ..... lb.	...	.61	...	.61	.50	.61
tks, wks ..... lb.	...	.59	...	.59	.48	.59
Dibutyl Ether, drs, wks, lcl lb.	...	.30	.26	.28	.26	.28
Dibutylphthalate, drs, wks, frt all'd ..... lb.	.20	.212	.21	.23½	.21	.23½
Dibutyltartrate, 50 gal drs lb.	.92	1.02	...	.92	.87	.92
Dichlorethylene, drs ..... lb.	...	.25	...	.25	...	.25
Dichloroethylether, 50 gal drs, wks ..... lb.	.15	.16	.15	.16	.15	.16
tks, wks ..... lb.	...	.14	...	.14	...	.14
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, c-l, drs lb.	...	.037	...	.037	...	.037
lcl, drs ..... lb.	...	.045	...	.045	...	.045
tks, wks ..... lb.	...	.03	...	.03	...	.03
Diethanolamine, tks, wks lb.	...	.22½	...	.22½	...	.22½
Diethylamine, 300 lb drs, lcl, f.o.b., wks ..... lb.	...	.81	...	.81	.70	.81
Diethylamino Ethanol, lcl, drs, f.o.b. Wyandotte, frt all'd E. Miss ..... lb.	...	.75	...	.75	.75	.85
Diethylaniline, 850 lb drs lb.	...	.40	...	.40	...	.40
Diethylcarbonate, com drs lb	...	.25	...	.25	...	.25

* These prices were on a delivered basis.



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METHYL CINNAMATE
METHYL PHENYL ACETATE
PHENYL ACETIC ACID
BENZALDEHYDE
BENZYL ALCOHOL
BENZYL CHLORIDE
BENZYL CYANIDE
DIETHYL MALONATE
DIMETHYL UREA
DI-NITRO CRESOL
CYANOACETAMIDE
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Racine, Wisconsin

Buy United States War Savings Bonds and Stamps

		Current Market		1943 Low	1943 High	1942 Low	1942 High
Diethylorthotoluidin, drs	lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, c-l, drs	lb.	.212	.217	...	.22	.21½	.22
Diethylsulfate, tech, drs, wks, lcl	lb.	...	.14	.13	.14	.13	.14
Diethyleneglycol, drs	lb.	.14	.15½	.14	.15½	.14	.15½
Mono ethyl ether, drs	lb.	.14½	.15½	.14½	.15½	.14½	.15½
tks, wks	lb.	...	.13½	...	.13½	...	.13½
Mono butyl ether, drs	lb.	.22½	.24½	.22½	.24½	.22½	.24½
tks, wks	lb.	...	.22	...	.22	...	.22
Diethylene oxide, 50 gal drs, wks	lb.	.20	.24	.20	.24	.20	.24
Diglycol Laurate, drs	lb.	.31	.33	.31	.33	.16	.33
Oleate, bbls	lb.	...	.17	...	.17	...	.17
Stearate, bbls	lb.	...	.22	...	.22	...	.22
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis	lb.	.85	.90	.85	.90	.85	.90
Dimethylaniline, 240 lb drs	lb.	.23	.24	.23	.24	.23	.24
Dimethyl phthalate, drs, wks, frt all'd	lb.	...	.20	...	.20	...	.20
Dimethylsulfate, 100 lb drs	lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls	lb.	...	.18	...	.18	...	.18
Dinitrochlorobenzene, 400 lb bbls	lb.	...	.14	...	.14	...	.14
Dinitronaphthalene, 350 lb bbls	lb.	.35	.38	.35	.38	.35	.38
Dinitrophenol, 350 lb bbls	lb.	...	.22	...	.22	...	.22
Dinitrotoluene, 300 lb bbls	lb.	...	.18	...	.18	...	.18
Diphenyl, bbls	lb.	...	.15	...	.15	...	.15
Diphenylamine (A)	lb.	...	.25	...	.25	...	.25
Diphenylguanidine, 100 lb drs	lb.	.35	.37	.35	.37	.35	.37
Dip Oil, see Tar Acid Oil.							
Divi Divi pods, bgs shipmt	ton	...	80.00	...	80.00	55.00	80.00
Extract	lb.	.05¾	.06¾	.05¾	.06¾	.05¾	.06¾
Drymet (see sodium metasilicate anhydrous).							
E							
Egg Yolk, dom, 200 lb cases	lb.	1.00	1.10	1.00	1.10	.87	1.10
Epsom Salt, tech, 300 lb bbls c-l, NY	100 lb.	...	1.90	...	1.90	...	1.90
USP, c-l, bbls	100 lb.	...	2.10	...	2.10	2.00	2.10
Ether, USP anaesthesia 55 lb drs	lb.	.60	.61	.60	.61	.52	.61
Isopropyl 50 gal drs	lb.	.07	.08	.07	.08	.07	.08
tks, frt all'd	lb.	...	.06	...	.06	...	.06
Nitrous conc bottles	lb.	.93	1.10	.93	1.10	.73	1.10
Synthetic, wks, tks	lb.	...	.12½	...	.12½	.08	.12½
Ethyl Acetate, 85% Ester tks, frt all'd	lb.	.107	.110	.11	.12	.11	.12
drs, frt all'd	lb.	.12	.13	.12	.13	.12	.13
99%, tks, frt all'd	lb.	.11¼	.12¼	.11¼	.12¼	.11¼	.12¼
drs, frt all'd	lb.	.12¼	.13¼	.12¼	.13¼	.12¼	.13¼
Acetoacetate, 110 gal drs	lb.	...	.37½	...	.37½	...	.37½
Benzylaniline, 300 lb drs	lb.	.86	.88	.86	.88	.86	.88
Bromide, tech drs	lb.	.50	.55	.50	.55	.50	.55
Cellulose, drs, wks, frt all'd	lb.	.50	.60	.50	.60	.50	.60
Chloride, 200 lb drs	lb.	.18	.20	.18	.20	.18	.20
Chlorocarbonate, cbys	lb.	...	.30	...	.30	...	.30
Crotonate, drs	lb.	...	.35	...	.35	...	.35
Diethanolamine, lcl, dms f.o.b. Wyandotte	lb.	.80	...	.80	...	...	...
Ethanolamines, lcl, dms f.o.b. Wyandotte	lb.	.60	...	.60	...	...	...
cl. dms. f.o.b. Wyandotte	lb.	.57	...	.57	...	...	...
Formate, drs, frt all'd	lb.	.27¾	.90	...	.27¾	...	.27¾
Lactate, drs, wks	lb.	...	.33½	...	.33½	...	.33½
Monoethanolamine, lcl, dms. f.o.b. Wyandotte	lb.	.80	...	.80	...	...	...
Oxalate, drs, wks	lb.	...	.33	...	.33	...	.33
Silicate, drs, wks	lb.	...	.77	...	.77	...	.77
Ethylene Dibromide, 60 lb drs	lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont	lb.	.75	.85	.75	.85	.75	.85
Anhydrous	lb.	...	.75	...	.75	...	.75
Dichloride, (*FP*) 50 gal drs, E. Rockies	lb.	...	.0842	...	.0742	...	.0742
Glycol, 50 gal drs, wks	lb.	...	.15½	...	.15½	.14½	.18½
tks, wks	lb.	...	.14½	...	.14½	.13½	.14½
Mono Butyl Ether, drs, wks	lb.	.16½	.20½	.16½	.17½	.16½	.17½
tks, wks	lb.	...	.15½	...	.15½	...	.15½
Mono Ethyl Ether, drs, wks	lb.	.14½	.16½	.14½	.15½	.14½	.15½
tks, wks	lb.	...	.13½	...	.13½	...	.13½
Mono Ethyl Ether Acetate, drs, wks	lb.	.11½	.15½	.11½	.12½	.11½	.12½
tks, wks	lb.	...	.10½	...	.10½	...	.10½
Mono Methyl Ether, drs wks	lb.	.15½	.16½	.15½	.16½	.15½	.16½
tks, wks	lb.	...	.14½	...	.14½	...	.14½
Oxide, cyl	lb.	.50	.55	.50	.55	.50	.55
Ethylideneaniline	lb.	.45	.47½	.45	.47½	.45	.47½
F							
Feldspar, blk pottery	ton	17.00	19.00	17.00	19.00	17.00	19.00
Powd, blk wks	ton	14.00	17.50	14.00	17.50	14.00	17.50
Ferric Chloride, tech, crys, 475 lb bbls	lb.	.05	.08	.05	.07½	.05	.07½
sol, 42° cbys	lb.	.06½	.07½	.06½	.07	.06½	.07

l + 10; *m* + 50; * Bbls. are 20c higher.
FP Full Priority. *PC* Price Ceiling. (A) Allocation.

		Current Market		1943 Low	1943 High	1942 Low	1942 High
Fish Scrap, dried, unground wks (*PC*)	unit *l*	no prices		no prices		4.75	4.85
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis	unit *m*	no prices		no prices		2.75	4.50
Fluorspar, 85.5% bgs (*PC*)	ton	25.00	28.00	28.00	32.00	28.00	34.00
Formaldehyde, c-l, bbls, wks (*FP*, *PC*)	lb.	.055	.0575	.055	.0575	.055	.0575
Fossil Flour	lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines	ton	8.50	15.00	8.50	15.00	8.50	15.00
Imp powd, c-l, bgs	ton	30.00	40.00	30.00	40.00	30.00	40.00
Furfural (tech) drs, wks	lb.	.10	.20	.15	.20	.15	.20
tks, wks	lb.	...	.09	...	.09	...	.09
Furfuramide (tech) 100 lb drs	lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities	lb.	.18½	.19½	.18½	.19½	.18	.19½
Fustic, crystals, 100 lb boxes	lb.	.28	.32	.28	.32	.28	.32
Liquid 50°, 600 lb bbls	lb.	.12½	.16	.12½	.16	.12½	.16
Solid, 50 lb boxes	lb.	.19	.21	.19	.21	.19	.21
G							
G Salt paste, 360 lb bbls	lb.	...	.45	...	.45	...	.45
Gambier, com 200 lb bgs	lb.	no prices		no prices		...	.09½
Singapore cubes, 150 lb bgs	100 lb.	.30	nom.	.30	nom.	.12½	.30
Glauber's Salt, tech, c-l, bgs, wks	100 lb.	1.05	1.25	1.05	1.25	1.05	1.28
Anhydrous, see Sodium Sulfate							
Glue, bone, com grades, c-l bgs	lb.	.15½	.19	.15½	.18½	.15½	.18½
Better grades, c-l, bgs	lb.	.19	.27½	.19	.30	.19	.30
Glycerin (*PC*) CP, drs	lb.	...	.18¼	...	.18¼	...	.18¼
Dynamite, 100 lb drs	lb.	...	.18¼	...	.18¼	...	.18¼
Saponification, drs	lb.	...	.12¾	...	.12¾	...	.12¾
Soap Lye, drs	lb.	...	.11½	...	.11½	...	.11½
Glyceryl Bori-Borate, bbls	lb.	...	.40	...	.40	...	.40
Monoricinoleate, bbls	lb.	...	.27	...	.27	...	.27
Monostearate, bbls	lb.	...	.30	...	.30	...	.30
Oleate, bbls	lb.	...	.22	...	.22	...	.22
Phthalate	lb.	...	.38	...	.38	...	.38
Glyceryl Stearate, bbls	lb.	...	.18	...	.18	...	.18
Glycol Bori-Borate, bbls	lb.	...	.22	...	.22	...	.22
Phthalate, drs	lb.	...	.38	...	.38	...	.38
Stearate, drs	lb.	...	.26	...	.26	...	.26
GUMS							
Gum Aloes, Barbadoes	lb.	.80	.85	.80	.85	.80	.85
Arabic, amber sorts	lb.	.14½	.16	.14½	.15	.14½	.24
White sorts, No. 1, bgs	lb.	.33	.35	.33	.35	.33	.35
Powd, bbls	lb.	.20	.29	.20	.21	.20	.28
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b. NY	lb.	.05¼	.13	.05¼	.12	.04½	.12
California, f.o.b. NY, drs	ton	35.00	40.00	35.00	40.00	20.00	40.00
Egyptian, 200 lb cases, f.o.b. NY	lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120 lb cases	lb.	.50	.55	.50	.55	.45	.55
Copal, Congo, 112 lb bgs, clean, opaque	lb.	...	.49½	...	.49½	...	.49½
Dark amber	lb.	...	.12¾	...	.12¾	...	.12¾
Light amber	lb.	...	.17	...	.17	...	.17
Copal, East India, 180 lb bgs Macassar pale bold	lb.	...	.17⅜	...	.17⅜	...	.17⅜
Chips	lb.	...	.11½	...	.11½	...	.11½
Dust	lb.	...	.07⅜	...	.07	...	.07
Nubs	lb.	...	.13⅜	...	.13⅜	...	.13⅜
Singapore, Bold	lb.	...	.22⅜	...	.22⅜	...	.22⅜
Chips	lb.	...	.11¾	...	.12⅜	...	.12⅜
Dust	lb.	...	.05½	...	.07	...	.07
Nubs	lb.	...	.16¾	...	.17¾	...	.17¾
Copal Manila, 180-190 lb (A)		...	.14	...	.14½	.14	.14½
Loba B	lb.	...	.13¼	...	.13¾	.13¾	.14¼
Loba C	lb.	...	.13⅜	...	.13⅜	.13⅜	.13⅞
DBB	lb.	...	.11	...	.11	.11	.12¼
MA sorts	lb.	...	.09¾	...	.09¾	.09¾	.10¼
Copal Pontianak, 224 lb cases, bold gen. (A)	lb.	...	.22⅜	...	.22⅜	.22⅜	.22⅞
Chips	lb.	...	.12⅜	...	.12⅜	.12⅜	.14½
Mixed	lb.	...	.17⅜	...	.17⅜	.17⅜	.17⅞
Nubs	lb.	...	.18⅜	...	.18⅜	.18⅜	.18⅞
Split	lb.	...	.19⅛	...	.19⅛	.19⅛	.19⅝
Damar Batavia, 136 lb cases (A)							
A	lb.	...	.35¾	...	.35¾	...	.35¾
B	lb.	...	.34⅜	...	.34⅜	...	.34⅜
C	lb.	...	.28⅝	...	.28⅝	...	.28⅝
D	lb.	...	.25⅝	...	.25⅝	...	.25⅝
A/D	lb.	...	.28⅜	...	.28⅜	...	.28⅜
A/E	lb.	...	.25⅝	...	.25⅝	...	.25⅝
E	lb.	...	.18¾	...	.18¾	...	.18¾
F	lb.	...	.13¾	...	.13¾	...	.13¾
Singapore, No. 1	lb.	...	.30⅝	...	.30⅝	...	.30⅝
No. 2	lb.	...	.25⅜	...	.25⅜	...	.25⅜
No. 3	lb.	...	.12⅜	...	.12⅜	...	.12⅜
Chips	lb.	...	.23½	...	.23½	...	.23½
Dust	lb.	...	.13	...	.13	...	.13
Seeds	lb.	...	.17¾	...	.17¾	...	.17¾
Elemi, cns, c-l (A)	lb.	...	.08⅞	...	.08⅞	...	.08⅞
Ester	lb.	.09½	.12	...	.10	.08½	.10
Gamboge, pipe, cases	lb.	2.30	2.35	2.30	2.35	.95	2.35
Powd, bbls	lb.	2.50	2.55	2.50	2.55	1.05	2.55
Ghatti, sol, bgs	lb.	.11	.15	.11	.15	.11	.15
Karaya, bbls, bxs, drs	lb.	.14	.33	.14	.33	.14	.33

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Kauri, NY
Logwood

Prices

	Current Market	1943 Low	1943 High	1942 Low	1942 High
Kauri, N Y (A)					
Brown XXX, cases ... lb.	...	.77	...	.77	.60	.77
BX ... lb.	...	.36	...	.38	...	.38
B1 ... lb.	...	.34	...	.34	.28	.34
B2 ... lb.	...	.30	...	.30	.24	.30
B3 ... lb	...	.22	...	.27½	.18½	.27½
Pale XXX ... lb.	...	.65¾	...	.66	.61	.66
No. 1 ... lb.	...	.43	...	.43	.41	.43
No. 2 ... lb.	...	.31	...	.31	.24	.31
No 3 ... lb.	...	.22	...	.22	.17¾	.22
Kino, tins ... lb.	no prices		no prices		no prices	
Mastic ... lb.	3.50	3.75	3.50	3.75	3.25	3.75
Sandarac, prime quality, 200 lb bgs & 300 lb cks lb.	...	.97½	.95	1.10	.95	1.10
Senegal, picked bgs ... lb.	...	.30	...	.30	...	.30
Sorts ... lb.	...	.13	...	.13	...	.13
Thus, bbls ... 280 lbs.	...	16.50	...	16.50	...	16.50
Tragacanth, No. 1, cases lb.	3.75	3.80	3.75	3.80	3.50	4.00
No. 2 ... lb.	3.40	3.45	3.40	3.45	2.00	3.45
No. 3 ... lb.	1.10	1.20	1.10	1.20	1.10	1.20
Yacca, bgs (*PC*) ... lb.	.06	.07½	.06	.07½	.06	.07¾
H						
Hematine crys, 400 lb bbls lb.	.24	.34	.24	.34	.24	.34
Hemlock, 25%, 600 lb bbls wks ... lb.	...	.0385	...	.0385	.03½	.0385
tks ... lb.	...	.0325	...	.0325	.03	.0325
Hexalene, 50 gal drs, wks lb.	...	.23	...	.23	...	.23
Hexane, normal 60-70° C. Group 3, tks (*PC*) ... gal.	.10½	.11	...	.11	...	.11
Hexamethylenetetramine, powd, drs (*FP*) ... lb.	.32	.33	.32	.33	.32	.33
Hexyl Acetate, secondary, delv, drs ... lb.	.13	.13½	.13	.13½	.13	.13½
Hoof Meal, f.o.b. Chicago unit tks ... lb.	4.35	4.50	4.35	4.50	3.00	4.50
Hydrogen Peroxide, 100 vol, 140 lb cbys ... lb.	... .16	.12 .18½	... .16	.12 .18½	... .16	.12 .18½
Hydroxylamine Hydrochloride ... lb.	...	3.15	...	3.15	...	3.15
Hypernic, Bags, No. 1 ... lb.	...	.42	...	.42	...	.42
I						
Indigo, Bengal, bbls ... lb.	2.14	2.20	2.14	2.20	2.14	2.20
Synthetic, liquid ... lb.	.16½	.19	.16½	.19	.16½	.19
Iodine, Resublimed, jars lb.	...	2.00	...	2.00	...	2.00
Irish Moss, ord, bales ... lb.	.26	.28	.26	.28	.26	.42½
Bleached, prime, bales lb.	.38	.50	.38	.50	.38	.85
Iron Acetate Liq, 17°, bbls delv ... lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride						
Nitrate, coml, bbls 100 lb.	3.50	4.00	3.50	4.00	3.50	4.00
Isobutyl Carbinol (128-132°C) drs, f.o.b. Wyandotte, Mich ... lb.	...	.23½	...	.23½	...	.23½
tks ... lb.	...	.21½	...	.21½	...	.21½
Isopropyl Acetate, tks, frt all'd ... lb.	...	.10	...	.10	.076	.10
drs, frt all'd, c-l ... lb.	...	.11	...	.12	.086	.12
Ether, see Ether, isopropyl						
K						
Keiselguhr, dom bags, c-l, Pacific Coast ... ton	22.00	25.00	22.00	25.00	22.00	25.00
L						
Lead Acetate, f.o.b. NY, bbls, (*PC*) White, broken ... lb.	...	.12½	...	.12½	.12	.13¼
cryst, bbls ... lb.	...	.12½	...	.12½	.12	.13¼
gran, bbls ... lb.	...	.13¼	...	.13¼	.12¾	.14
powd, bbls ... lb.	...	.13¼	...	.13¼	.12¾	.14
Arsenate, East, drs ... lb.	.11	.12	.11	.12	.11	.12
Linoleate, solid, bbls ... lb.	...	.22½	...	.22½	.19	.22½
Metal, c-l, NY (*FP*) 100 lb.	...	6.50	5.85	5.90	5.85	5.90
Nitrate, 500 lb bbls, wks lb.	...	.12½	.11	.14	.11	.14
Oleate, bbls ... lb.	...	.17¾	...	.17¾	.17¾	.20
Red, dry, 95% Pb_3O_4, delv ... lb.	.09	.10¼	...	.10¼	.09	.10¼
97% Pb_3O_4, delv ... lb.	.09¼	.11	...	.09½	.09¼	.09½
98% Pb_3O_4, delv ... lb.	.10	.11¼	...	.10½	.09½	.10½
Resinate, fused, bbls ... lb.	.10	.12	.10	.12	.09½	.12
Stearate, bbls ... lb.	.31	.33	...	.25	...	.25
Titanate, bbls, c-l, f.o.b. wks, frt, all'd ... lb.	...	.11	...	.10¼	...	.10¼
White, 500 lb bbls, wks, lb.	.08¼	.08¾	...	.07½	...	.07½
Basic sulfate, 500 lb bbls. wks ... lb.	.07¼	.08	...	.07½	.06½	.07½
Lecithin, ed, drs, cl ... lb.	...	.28½	...	.28½	.28½	.34
tech, drs, cl ... lb.	...	.26	...	.26	.26	.28
Lime, chemical quicklime, f.o.b. wks, bulk ... ton	6.25	13.00	7.00	13.00	7.00	13.00
Hydrated, f.o.b. wks ... ton	8.50	16.00	8.50	16.00	8.50	16.00
Lime Salts, see Calcium Salts						
Lime, sulfur, dealers, tks gal.	no prices		no prices		.07½	.08½
drs ... gal.	no prices		no prices		.10	.14
Linseed Meal, bgs ... ton	no prices		no prices		33.50	36.00
Litharge, coml, delv, bbls lb.	.08	.09¾	...	.08	.079	.08
Lithopone, dom, ordinary, (*PC*), delv, bgs ... lb.	...	.04¼	...	.04¼	...	.04¼
bbls ... lb.	...	.04½	...	.04½	...	.04½
Titanated, bgs ... lb.	...	.056	...	.056	...	.056
bbls ... lb.	...	.0585	...	.0585	...	.0585
Logwood, 51°, 600 lb bbls lb.	...	.14	...	.14	.13	.14
Solid, 50 lb boxes ... lb.	...	.23½	...	.23½	.22	.23½

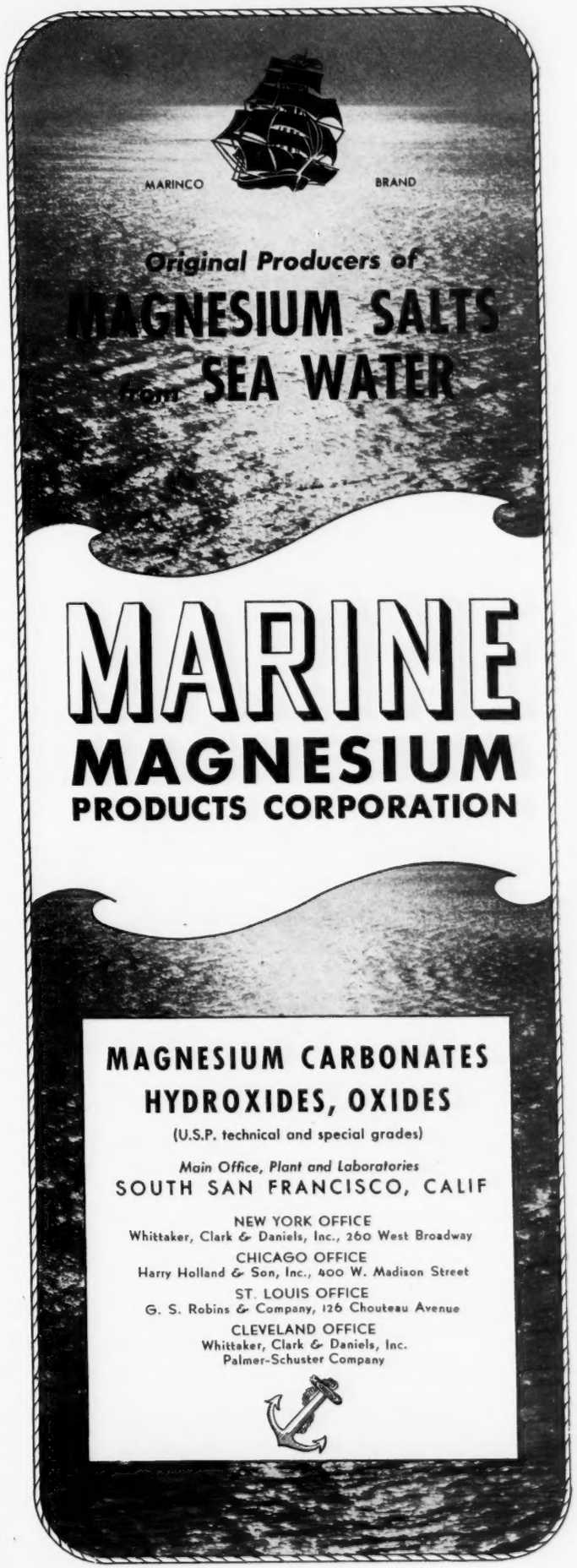
FP Full Priority. *PC* Price Ceiling. (A) Allocation.

Current

	Current Market	1943 Low	1943 High	1942 Low	1942 High
M					
Madder, Dutch ..... lb.	.24	.30	.24	.30	.22	.30
Magnesite, calc, 500 lb bbls ton	84.00	90.00	84.00	90.00	74.00	90.00
Magnesium Carb, tech, 70 lb bgs, wks ..... lb.	...	.06¼	...	.06¼	...	.06¼
Chloride flake, 375 lb bbls, c-l, wks ..... ton	...	32.00	...	32.00	...	32.00
Metal, Ingots, c-l ..... lb.	...	.27	...	.27	...	.27
Oxide, calc tech, heavy bbls, frt all'd ..... lb.	...	.26	...	.26	...	.26
Light bbls above basis lb.	...	.26	...	.26	...	.26
USP Heavy, bbls, above basis ..... lb.	...	.26	...	.26	...	.26
Palmitate, bbls ..... lb.	.33	.35	.33	.35	.33	.35
Silicofluoride, bbls ..... lb.	.18	.20	.18	.20	.18	.25
Stearate, bbls ..... lb.	.31	.32	.31	.32	.31	.33
Manganese, acetate, drs .. lb.	...	.26½	...	.26½	...	.26½
Borate, 30%, 200 lb bbls lb.	.15	.17	.15	.17	.15	.17
Chloride, bbls ..... lb.	.14	nom.	.14	nom.	.13	.14
Dioxide, tech (peroxide), paper bags, c-l ..... ton	70.00	73.00	...	74.75	70.00	74.75
Hydrate, bbls ..... lb.	...	.82	...	.82	...	.82
Linoleate, liq, drs ..... lb.	...	.20	...	.20	.18	.20
solid, precip, bbls .... lb.	...	.22	...	.22	.19	.22
Resinate, fused bbls ... lb.	.09	.10½	.09	.10½	.08¼	.10½
precip, drs ..... lb.	.14½	.15½	.14½	.15½	.12	.15½
Sulfate, tech, anhyd, 90-95%, 550 lb drs ..... lb.	...	.11¼	...	.11¼	.10½	.11½
Mangrove, 55%, 400 lb bbls lb.						
Bark, African ..... ton	...	60.00	...	60.00	no prices	
Mannitol, pure cryst, cs, wks lb.	...	.85	...	.85	...	.85
commercial grd, 250 lb bbls ..... lb.	.35	.40	...	.40	...	.40
Marble Flour, blk ..... ton	12.50	14.50	12.50	14.50	12.50	14.50
Mercury chloride (Calomel) lb.	...	2.95	...	2.95	...	2.95
Mercury metal ..76 lb. flasks	191.00	193.00	...	193.00	191.00	210.00
Mesityl Oxide, f.o.b. dest, tks ..... lb.	...	.10½	...	.10½	...	.10½
drs, c-l ..... lb.	...	.11½	...	.12½	.11½	.12½
drs, lcl ..... lb.	.12	.13	...	.13	.12	.13
Meta-nitro-aniline ..... lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls ..... lb.	1.05	1.10	1.05	1.10	1.05	1.10
Meta-phenylene diamine 300 lb bbls ..... lb.	...	.65	...	.65	...	.65
Meta-toluene-diamine 300 lb bbls ..... lb.	...	.70	...	.70	...	.70
Methanol, denat, grd, drs, c-l, frt all'd (*PC*) ..gal.	...	.66	...	.66	...	.66
tks, frt all'd ..... gal.	...	.60	...	.60	...	.60
Pure, nat, drs, c-l, frt all'd ..... gal. *a*	.55½	.75½	.55½	.61½	.55½	.61½
tks, nat ..... gal. *a*	.50	.54½	.50	.54½	.50	.54½
Synth, pure, drs .... gal. *b*	.34½	.40½	.34½	.40½	.34½	.40½
tks, synth ..... gal. *b*	.28	.32½	.28	.32½	.28	.32½
Methyl Acetate, tech tks, delv ..... lb.	.06	.07	.06	.07	.06	.07
55 gal drs, delv ..... lb.	.11	.12½	.11	.12½	.11	.12½
C.P. 97-99%, tks, delv lb.	.09½	.10½	.09½	.10½	.09½	.10½
55 gal drs, delv ..... lb.	.10½	.13	.10½	.13	.10½	.13
Acetone, frt all'd, drs gal. *p*	...	.66	...	.81	...	.81
tks, frt all'd ..... gal. *p*	...	.60	...	.75	...	.75
Synthetic, frt, all'd, drs ..... gal. *p*	.51	.54½	.51	.54½	.51	.54½
tks, frt all'd ..... gal.	.43	.45½	.43	.45½	.43	.45½
Anthraquinone ..... lb.	...	.83	...	.83	...	.83
Butyl Ketone, tks ..... lb.	...	.10½	...	.10½	...	.10½
Cellulose, 100 lb lots, frt all'd ..... lb.	...	.58	.50	.55	.50	.55
less than 100 lbs f.o.b. wks ..... lb.	...	.63	...	.60	...	.60
Chloride, 90 lb cyl .... lb.	.32	.40	.32	.40	.32	.40
Ethyl Ketone, tks, frt all'd lb.	...	.08	...	.08	...	.08
50 gal drs, frt all'd, c-l lb.	...	.09	...	.09½	...	.09½
Formate, drs, frt all'd .. lb.	...	.89	...	.89	...	.89
Hexyl, Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Lactate, drs, frt all'd .. lb.	...	.70	...	.70	...	.70
Mica, dry grd, bgs, wks .. ton	...	30.00	...	30.00	...	30.00
Michler's Ketone, kgs ...lb.	...	2.50	...	2.50	...	2.50
Mixed Amylnaphthalenes mixed, ref, l-c-l, drs, f.o.b. wks ..... lb.	...	.16	...	.16	...	.16
crude ..... lb.	...	.14	...	.14	...	.14
Monoamylamine, cl, drs, wks lb.	...	.61	...	.61	.50	.61
lcl, drs, wks on (100% basis) ..... lb.	...	.64	...	.64	...	.64
Monoamylnaphthalene, lcl, drs, f.o.b. wks ..... lb.	...	.17	...	.17	...	.17
Monobutylamine, drs (100% basis) c-l, wks ..... lb.	...	.48	...	.48	.40	.48
l-c-l, wks ..... lb.	...	.51	...	.51	.51	.64
Monochlorobenzene, see "C"						
Monoethanolamine, tks, wks lb.	...	.23	...	.23	...	.23
Monoethylamine (100% basis) lcl, drs, f.o.b. wks ..... lb.	...	.46	...	.46	...	.46
Monomethylamine, drs, frt all'd, E. Mississippi, c-l lb.	...	.65	...	.65	...	.65
Monomethylparamiosulfate, 100 lb drs ..... lb.	3.75	4.00	3.75	4.00	3.75	4.00
Morpholine, drs 55 gal, wks ..... lb.	...	.67	...	.67	...	.67

a Producers of natural methanol divided into two groups and prices vary for these two divisions; *b* Country is divided in 4 zones, prices varying by zone; *p* Country is divided into 4 zones.

(*FP*) Full Priority. (*PC*) Price Control.



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Myrobalans
Para Toluidine

Prices

	Current Market	1943 Low	1943 High	1942 Low	1942 High
Myrobalans 25%, liq bbls lb.	no prices	no prices		no prices	
50% Solid, 50 lb boxes lb.	no prices	no prices		no prices	
J2 bgs f.a.s. ton	... 65.00	... 65.00		no prices	
J1 bgs f.a.s. ton	... 60.00	... 60.00		no prices	
N					
Naphtha, vm&p, (deodorized) see petroleum solvents.					
Naphtha, Solvent, water-white, tks gal.	... .27	... .27	... .27		
drs, c-l gal.	... .31	... .31	... .31		
Naphthalene, dom, crude bgs. wks lb.	2.75 3.00	2.75 3.00	2.50 3.00		
Balls, flakes, pks lb.	... .08½	... .08	... .08		
Balls, ref'd, bbls, wks lb.	... .08	... .08	... .08		
Flakes, ref'd, bbls, wks lb.	... .08	... .08	... .08		
Nickel Carbonate, bbls (A) lb.	.36 .36½	.36 .36½	.36 .36½		
Chloride, bbls lb.	.18 .20	.18 .20	.18 .20		
Metal ingot lb.	.35 .36	.35 .36	.35 .36		
Oxide, 100 lb kgs, NY lb.	.35 .38	.35 .38	.35 .38		
Salt, 400 lb bbls, NY lb.	.13 .13½	.13 .13½	.13 .13½		
Nicotine, sulfate, 40%, drs, 55 lb drs lb.	... .703	... .703	... .703		
Nitre Cake, blk ton	... 16.00	... 16.00	... 16.00		
Nitrobenzene redistilled, 1000 lb drs, wks lb.	.08 .09	.08 .09	.08 .09		
tks lb.	... .07	... .07	... .07		
Nitrocellulose, c-l, lcl, wks lb.	.25 .26	.20 .29	.20 .29		
Nitrogen Sol 45½% ammon, f.o.b. Atlantic & Gulf ports, tks, unit ton, N basis	... 1.2158	... 1.2158	... 1.2158		
Nitrogenous Mat'l, bgs imp unit	no prices	no prices	no prices		
dom, Eastern wks unit	... 3.00	... 3.00	2.75 3.50		
dom, Western wks unit	... 2.90	... 2.90	2.60 3.35		
Nitronaphthalene, 550 lb bbls lb.	.24 .25	.24 .25	.24 .25		
Nutgalls Alleppo, bgs lb.	no prices	no prices	no prices		
O					
Oak Bark Extract, 25%, bbls lb.	... .0385	... .0385	.03½ .03¾		
tks lb.	... .0325	... .0325	.02 .0325		
Octyl Acetate, tks, wks lb.	... .15	... .15	... .15		
Orange-Mineral, 1100 lb cks NY lb.	... .12	... .12	... .12		
Orthoaminophenol, 50 lb kgs lb.	2.15 2.25	2.15 2.25	2.15 2.25		
Ortho amyl phenol, l-c-l, drs, f.o.b. wks lb.	... .25	... .25	... .25		
Orthoanisidine, 100 lb drs lb.	... .70	... .70	... .70		
Orthochlorophenol, drs lb.	... .32	... .32	... .32		
Orthocresol, 30.4°, drs, wks (A) lb.	.17½ .18	.17½ .18	.17 .18		
Orthodichlorobenzene, 1000 lb, drs, c-l lb.	.06 .07½	.06 .07½	.06 .07½		
Orthonitrochlorobenzene, 1200 lb drs, wks lb.	.15 .18	.15 .16	.15 .18		
Orthonitroparachlorphenol, cns lb.	... .75	... .75	... .75		
Orthonitrophenol, 350 lb drs lb.	.85 .90	.85 .90	.85 .90		
Orthonitrotoluene, 1000 lb drs, wks lb.	... .09	... .09	... .09		
Orthotoluidine, 350 lb bbls, lcl lb.	... .19	... .19	... .19		
Osage Orange, cryst, bgs lb.	... .23	... .23	... .23		
51° liquid No. 1 lb.	... .11	... .10	... .10		
P					
Paraffin, rfd, 200 lb bgs (*PC*) 122-127° M P lb.	... .052	... .052	... .052		
128-132° M P lb.	.056 .0585	.056 .0585	.056 .0585		
133-137° M P lb.	.0615 .0640	.0615 .0640	.0615 .0640		
Para aldehyde, 99%, tech, 55-110 gal drs, wks lb.	... .12	... .12	... .12		
Aminoacetanilid, 100 lb kgs lb.	... .85	... .85	... .85		
Aminohydrochloride, 100 lb. kgs lb.	1.25 1.30	1.25 1.30	1.25 1.30		
Aminophenol, 100 lb kgs lb.	... 1.05	... 1.05	... 1.05		
Chlorophenol, drs lb.	... .32	... .32	... .32		
Dichlorobenzene 200 lb drs, wks lb.	.11 .13	.11 .12	.11 .12		
Formaldehyde, drs, wks (*FP*) lb.	.23 .24	.23 .24	.23 .24		
Nitroacetanilid, 300 lb bbls lb.	.45 .52	.45 .52	.45 .52		
Nitroaniline, 300 lb bbls, wks lb.	... .45	... .45	... .45		
Nitrochlorobenzene, 1200 lb drs, wks lb.	... .15	... .15	... .15		
Nitro-orthotoluidine, 300 lb bbls lb.	2.75 2.85	2.75 2.85	2.75 2.85		
Nitrophenol, 185 lb bbls lb.	... .35	... .35	... .35		
Nitrosodimethylaniline, 120 lb bbls lb.	.92 .94	.92 .94	.92 .94		
Nitrotoluene, 350 lb bbls lb.	... .30	... .30	... .30		
Pentaerythritol, tech, bbls, delv lb.	.33½ .35½	.33½ .35½	.33½ .35½		
Phenylenediamine, 350 lb bbls lb.	1.25 1.30	1.25 1.30	1.25 1.30		
Toluenesulfonamide, 175 lb bbls lb.	... .70	... .70	... .70		
Toluenesulfonchloride, 410 lb bbls, wks lb.	.20 .22	.20 .22	.20 .22		
Toluidine, 350 lb bbls, wks lb.	... .48	... .48	... .48		

(*FP*) Full Priority. (*PC*) Price Control (A) Allocation.

Current

Paris Green
Potassium Perchlorate

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Paris Green, dealers, drs, lb.	.24	.26	.24	.26	.24	.26
Pentane, normal, 28-38° C, group, 3 tks (*PC*) ..gal.	.06½	.07½	...	.06½	..06½	.08½
drs, group 3 .....gal.	.11	.19	...	.11	.11½	.16
Perchlorethylene, 10 lb drs, frt all'd (*FP*) .....lb.	.08	.08½	.08	.08½	.08	.08½
Petrolatum, dark amber, bbls .....lb.	...	.03⅜	...	.03¾	...	.03¾
White, lily, bbls .....lb.	...	.05½	...	.05¾	...	.05¾
White, snow, bbls .....lb.	...	.06¼	...	.06½	...	.06½
Petroleum Ether, 30-60°, Group 3, drs .....gal.	...	.18	...	.16	...	.16
drs, group 3 .....gal.	...	.18	...	.18	...	.18
PETROLEUM SOLVENTS AND DILUENTS						
Cleaners naphthas, group 3, tks, wks .....gal.	...	.07½	...	.07⅛	...	.07⅛
East Coast, tks, wks gal.	...	.11	...	.11	.10½	.11
Lacquer diluents, tks, East Coast .....gal.	...	.11	...	.11	...	.11
group 3, tks .....gal.	.07⅜	.07⅝	.07⅜	.07½	.07⅜	.08⅛
Naphtha, V.M.P., East tks, wks .....gal.	...	.11	...	.11	.10½	.11
Group 3, tks, wks ..gal.	...	.07½	...	.07⅛	...	.07⅛
Petroleum thinner, 43-47, East, tks, wks .....gal.	.08¾	.09½	.08¾	.09½	.08¾	.09½
Group 3, tks, wks ..gal.	.06	.07	.06	.07	.06	.07
Rubber Solvents, stand grd, East, tks, wks ..gal.	...	.11	...	.11	.10½	.11
Group 3, tks, wks ..gal.	...	.07½	...	.07⅛	...	.07⅛
Stoddard Solvents, East, tks, wks .....gal.	...	.09½	...	.09½	...	.09½
Group 3, wks .....gal.	...	.06⅝	...	.06⅝	...	.06⅝
Phenol, 250-100 lb drs ...lb.	.10½	.11¼	...	.12½	.12½	.13
tks, wks (*FP*) (A) ....lb.	...	.09½	...	.11½	.11½	.12
Phenyl-Alpha-Naphthylamine, 100 lb kgs .....lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs .....lb.	...	.17	...	.17	...	.17
Phenylhydrazine Hydrochloride, com .....lb.	...	1.75	...	1.75	...	1.75
Phloroglucinol, tech, tins lb.	15.00	16.00	15.00	16.50	15.00	16.50
CP, tins .....lb.	20.00	22.00	20.00	22.00	20.00	22.00
Phosphate Rock, f.o.b. mines 70% basis .....ton	...	2.70	...	2.70	2.40	2.70
72% basis .....ton	...	3.00	...	3.20	3.00	3.20
Florida Pebble, 68% basis ton	...	2.40	...	2.00	2.00	2.20
75-74% basis .....ton	...	4.00	...	4.00	...	4.00
Tennessee, 72% basis ton	...	5.30	...	5.30	5.00	5.50
Phosphorus Oxychloride 175 lb cyl (*FP*) .....lb.	.15	.18	.15	.18	.15	.18
Red, 110 lb cases .....lb.	.40	.44	.40	.44	.40	.44
Sesquisulfide, 100 lb cs lb.	.38	.42	.38	.42	.38	.42
Trichloride, cyl .....lb.	.15	.16	.15	.16	.15	.16
Yellow, 110 lb drs, wks lb.	.18	.20	.18	.20	.18	.20
Phthalic Anhydride, 100 lb drs, wks (A) .....lb.	.14½	.15½	.14½	.15½	.14½	.15½
Pine Oil, 55 gal drs or bbls Destructive dist .....lb.	.72	.74	.72	.74	.72	.74
Steam dist wat wh bbls gal.	1.00	nom.	1.00	nom.	1.00	1.10
Pitch Hardwood, wks ...ton	23.75	24.00	23.75	24.00	23.75	24.00
Coaltar, bbls, wks ....ton	19.00	22.00	19.00	22.00	19.00	22.00
Burgundy, dom, bbls, wks lb.	.06	.06½	.06	.06½	.06	.06½
Imported .....lb.	no prices		no prices		no prices	
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls .....bbl.	...	6.00	...	6.00	6.00	7.00
Polyamylnaphthalene, 1-c-l, drs, f.o.b. wks .....lb.	...	.25	...	.25	...	.25
Potash, Caustic, wks, sol lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
flake .....lb.	.07	.07½	...	.07	...	.07
liquid, tks .....lb.	...	.02⅞	...	.02⅞	...	.02⅞
Manure Salts, Dom 30% basis, blk ....unit	...	.60	...	.60	...	.60
POTASSIUM						
Potassium Abietate, bbls ..lb.	...	.08	...	.08	...	.08
Acetate, USP, bbls, delv lb.	...	.28	...	.28	...	.28
Bicarbonate, USP, 320 lb bbls .....lb.	.19	.21	.19	.21	.14	.21
Bichromate Crystals, 725 lb csks *(*FP*) .....lb.	.09⅝	.10	...	.09⅝	...	.09⅝
Binoxalate, 30 lb bbls ..lb.	...	.23	...	.23	...	.23
Bisulfate, 100 lb kgs ..lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800 lb cks .....lb.	.06½	.06¾	.06½	.06¾	.06½	.06¾
liquid, tks .....lb.	...	.0275	...	.0275	...	.0275
drs, wks .....lb.	.03	.03½	.03	.03⅛	.03	.03⅛
Chlorate crys, 112 lb kgs, wks (*FP*) (A) .....lb.	.11	nom.	nom.	.11	nom.	.11
gran, kgs .....lb.	.12	.14½	.12	.14½	.12	.14½
powd, kgs .....lb.	.09¾	.10	.09¾	.10	.09¾	.10
Chloride, crys, bbls ....lb.	.08	nom.	.08	nom.	.08	nom.
Chromate, kgs (*FP*) ..lb.	.24	.27	.24	.27	.24	.27
Cyanide, drs .....lb.	...	.55	...	.55	...	.55
Iodide, 250 lb bbls ....lb.	1.44	1.48	1.44	1.48	1.44	1.48
Metabisulfite, 300 lb bbls lb.	.18	.19	.18	.20	.18	.20
Muriate, bgs, dom, blk unit	...	.53½	.56	.58	.56	.58
Oxalate, bbls .....lb.	.28	.30	.28	.30	.28	.30
Perchlorate, kgs, wks (*FP*) (A) .....lb.	.09½	.11	.09½	.11	.09½	.11

* Spot price is ½c higher.
(*FP*) Full Priority. (*PC*) Price Control. (A) Allocation.

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	Current Market	1943 Low	1943 High	1942 Low	1942 High
Potassium (continued):					
Permanganate, USP, crys, 500 & 1000 lb drs, wks (*FP*) ....lb.	.21¼	.22¾	.19¾ .20¼	.19¾	.21
Prussiate, red, bbls ....lb.	.70	.75	.70 .75	.70	.75
Yellow, bbls ....lb.	.16	.17	.17 .19	.17	.19
Sulfate, 90% basis, bgs ton	...	36.25	... 36.25	...	36.25
Titanium Oxalate, 200 lb bbls ....lb.	...	.45	... .45	...	.45
Pot & Mag Sulfate, 48% basis bgs ....ton	...	26.00	... 26.00	...	26.00
Propane, group 3, tks (*PC*) lb.	.03	.03¾	.02¾ .03¾	.02¾	.03¾
Putty, com'l, tubs ....100 lb.	...	3.15	... 3.15	...	3.15
Linseed Oil, kgs ...100 lb.	4.20	5.50	... 5.00	...	5.00
Pyrethrum, conc liq: (A)					
2.4% pyrethrins, drs, frt all'd ....gal.	...	5.75	... 5.75	4.30	5.75
3.6% pyrethrins, drs, frt all'd ....gal.	...	8.53	... 8.53	6.35	8.53
Flowers, coarse, bgs ...lb.					
bgs ....lb.	.27	.28	.27 .28	.21	.28
Fine powd, bbls ....lb.	...	.23	... .23	.22	.29
Pyridine, denat, 50 gal drs gal.	...	1.71	... 1.71	...	1.71
Refined, drs ....lb.	...	.46	... .46	...	.46
Pyrites, Spanish cif Atlantic ports, blk ....unit	no prices		no prices		no prices
Pyrocatechin, CP, drs, tins lb.	2.15	2.40	2.15 2.40	2.15	2.40
Q					
Quebracho, 35% liq tks ..lb.	...	.04	... .05¼	...	.05¼
450 lb bbls, c-l ....lb.	...	.04½	... .05	...	.05
Solid, 63%, 100 lb bales cif ....lb.	...	.04⅞	... .04⅞	...	.04⅞
Clarified, 64% bales lb.	...	.05	... .05	...	.05
Quercitron, 41 deg liq, 450 lb bbls No. 1 ....lb.	...	.10	... .10	...	.10
Solid, drs ....lb.	...	.18½	... .18½	.18	.18½
R					
R Salt, 250 lb bbls, wks lb.	...	.55	... .55	...	.55
Resorcinol, tech cans ....lb.	.68	.74	.68 .74	.68	.74
Rochelle Salt, cryst ....lb.	...	.43½	... .43½	...	.43½
Powd, bbls ....lb.	...	.42½	... .42½	...	.42½
Rosin Oil, bbls, first run gal	...	.58	... .58	.48	.58
Second run ....gal.	...	.60	... .60	.50	.60
Third run, drs ....gal.	...	.64	... .64	.54	.64
Rosins 600 lb bbls, 100 lb unit ex, yard NY:**					
B	...	3.65	... 3.75	2.96	3.90
D	...	3.70	... 2.84	2.73	4.05
E	...	3.95	... 3.99	3.06	4.09
F	...	4.10	... 4.06	3.27	4.13
G	...	4.15	... 4.15	3.52	4.13
H	...	4.18	... 4.10	3.53	4.13
I	...	4.32	... 4.15	3.53	4.13
K	...	4.45	... 4.27	3.56	4.14
M	...	4.53	... 4.35	3.66	4.16
N	...	4.60	... 4.40	3.67	4.17
WG	...	4.65	... 4.45	3.69	4.81
WW	...	4.70	... 4.50	3.73	5.20
X	...	4.50	... 4.50	3.73	5.20
Rosins, Gum, Savannah (280 lb. unit):**					
B	...	3.51	... 3.10	2.08	3.25
D	...	3.60	... 3.19	2.31	3.40
E	...	3.85	... 3.34	2.41	3.44
F	...	4.01	... 3.41	2.62	3.47
G	...	4.05	... 3.50	2.87	3.47
H	...	4.05	... 3.45	2.88	3.48
I	...	4.15	... 3.50	2.88	3.50
K	...	4.36	... 3.62	2.91	3.62
M	...	4.41	... 3.70	3.05	3.70
N	...	4.51	... 3.75	3.05	3.75
WG	...	4.61	... 3.80	3.05	3.80
WW	...	4.66	... 3.85	3.06	3.85
X	...	4.66	... 3.85	3.10	3.85
Rotten Stone, bgs mines ton	25.00	37.50	25.00 37.50	25.50	37.50
Imported, lump, bbls ...lb.	no prices		no prices		no prices
Powdered, bbls ....lb.	no prices		no prices		no prices
S					
Sago Flour, 150 lb bgs ..lb.	.05	.05¾	.05 .05¾	.04¾	.05¾
Sal Soda, bbls wks ...100 lb.	...	1.20	... 1.20	...	1.20
Salt Cake, 94-96%, c-l, bulk wks ....ton	...	15.00	... 15.00	...	15.00
Chrome, c-l, wks ....ton	16.00	nom.	... 16.00	...	16.00
Saltpetre, gran, 450-500 lb bbls ....lb.	.082	.086	... .082	...	.082
Cryst, bbls ....lb.	...	.092	... .092	...	.092
Powd, bbls ....lb.	...	.092	... .092	...	.092
Satin, White, pulp, 550 lb bbls ....lb.	.01¼	.01½	.01¼ .01½	.01¼	.01½
Schaeffer's Salt, kgs ....lb.	...	.46	... .46	...	.46

**Jan. 30, 1941, high and low based on 280 lb. unit. Dec. 30 prices. r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y., refined 6c higher in each case; (*FP*) Full Priority. (*PC*) Price Ceiling. (A) Allocation.

Current

Shellac
Sodium Sulfite

	Current Market	1943 Low	1943 High	1942 Low	1942 High
Shellac, Bone dry, bbls ..lb. *s*	...	.42½	...	.42½	.39	.42½
Garnet, bgs .....lb.	...	.389	...	.389	.37	.39
Superfine, bgs .....lb. *s*	...	.366	...	.366	.32	.366
T. N., bgs .....lb. *s*	...	.355	...	.355	.31	.355
Silver Nitrate, vials .....oz.	...	.32⅜	...	.32⅜	.26⅞	.32⅜
Slate Flour, bgs, wks ....ton	11.00	12.00	11.00	12.00	9.00	12.00
Soda Ash, 58% dense, bgs, c-l, wks .....100 lb.	...	1.15	...	1.15	...	1.15
58% light, bgs ....100 lb.	1.05	1.13	1.05	1.13	1.05	1.13
blk .....100 lb.	...	.90	...	.90	...	.90
paper bgs .....100 lb.	1.05	1.08	1.05	1.08	1.05	1.08
bbls .....100 lb.	...	1.35	...	1.35	...	1.35
Caustic, 76% grnd & flake, drs .....100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drs ....100 lb.	...	2.30	...	2.30	...	2.30
Liquid, sellers tks ..100 lb.	...	2.00	...	2.00	...	2.00
SODIUM						
Sodium Abietate, drs ....lb.	...	.11	...	.11	...	.11
Acetate, 60% tech, gran, powd, flake, 450 lb bbls wks .....lb.	...	.05	...	.05	...	.05
90%, bbls, 275 lb delv lb.	.06	.07	.06½	.07	.06½	.07
anhyd, drs, delv .....lb.	.08½	.10	.08½	.10	.08½	.10
Alginate, drs .....lb.	...	.79	...	.79	.69	.79
Antimoniate, bbls .....lb.	.15	.15½	.15	.15½	.15	.15½
Arsenate, drs .....lb.	...	.08	...	.08	...	.08
Arsenite, liq, drs .....gal.	...	.35	...	.35	...	.35
Dry, gray, drs, wks ..lb.	.06¾	.08½	...	.08½	.06¾	.08½
Benzoate, USP kgs ....lb.	.46	.52	.46	.50	.46	.50
Bicarb, powd, 400 lb bbl, wks .....100 lb.	1.85	2.51	...	1.85	1.70	1.85
Bichromate, 500 lb cks, wks* (*FP*) .....lb.	...	.07⅜	...	.07⅜	...	.07⅜
Bisulfite, 500 lb bbls, wks lb.	.03	.031	.03	.031	.03	.031
35-40% solbbls, wks100 lb.	1.40	1.65	1.35	1.80	1.35	1.80
Chlorate, bgs, wks (A) lb.	...	.06¾	...	.06¼	...	.06¼
Cyanide, 96-98%, 100 & 250 lb drs, wks .....lb.	.14	.15	.14	.15	.14	.15
Diacetate, 33-35% acid, bbls, lcl, delv .....lb.	.09½	.10½	.09½	.10½	.09½	.10½
Fluoride, white 90%, 300 lb bbls, wks .....lb.	...	.08¼	...	.08	...	.08
Hydrosulfite, 200 lb bbls, f.o.b. wks .....lb.	.17	.18	.17	.18	.17	.18
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	...	2.80	2.75	2.70	2.70	3.00
Tech, reg cryst, 375 lb bbls, wks .....100 lb.	...	2.45	...	2.45	...	2.45
Iodide, Jars .....lb.	...	2.42	...	2.42	...	2.42
Metanilate, 150 lb bbls lb.	...	.40	...	.40	...	.40
Metasilicate, gran, c-l, wks .....100 lb.	...	2.50	...	2.50	...	2.50
cryst, drs, c-l, wks 100 lb.	...	3.05	...	3.05	...	3.05
Anhydrous, wks, c-l, drs .....100 lb.	...	4.00	...	4.00	...	4.00
wks, lcl, drs ..100 lb.	...	5.05	...	5.05	...	5.05
Monohydrated, bbls ....lb.	...	.03	...	.03	.026	.03
Naphthenate, drs .....lb.	.12	.19	.12	.19	.12	.19
Naphthionate, 300 lb bbl lb.	...	.50	...	.50	...	.50
Nitrate, 92% crude, 200 lb. bgs, c-l, NY (A) ...ton	...	29.35	...	29.35	...	29.35
100 bgs, same basis ton	...	30.05	...	30.05	...	30.05
Bulk .....ton	...	27.00	...	27.00	...	27.00
Nitrite, 500 lb bbls ....lb.	...	.06¾	...	.06¾	...	.06¾
Orthochlorotoluene, sulfonate, 175 lb bbls, wks lb.	.25	.27	.25	.27	.25	.27
Orthosilicate, 300 lb drs, c-l, anhyd .....lb.	...	.04½	...	.04½	.04½	.04¾
hyd, flake, 300 lb bbls, c-l, f.o.b. wks .....lb.	...	.0315	...	.0315	.03	.0315
Perborate, drs, 400 lb ..lb.	...	.14¾	...	.14¾	...	.14¾
Peroxide, bbls, 400 lb ..lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	2.75	2.90	2.75	2.90	2.75	2.90
bgs, wks .....100 lb.	2.55	2.70	2.55	2.70	2.55	2.70
Tri-sodium, tech, 325 lb bbls, wks .....100 lb.	...	2.90	...	2.90	2.90	3.05
bgs, wks .....100 lb.	...	2.70	...	2.70	2.70	2.85
Picramate, 160 lb kgs ..lb.	...	.65	...	.65	...	.65
Prussiate, Yellow, 350 lb bbls, wks .....lb.	...	.11	...	.11	...	.11
Pyrophosphate anhyd, 100 lb bbls, f.o.b. wks, frt eq lb.	.0528	.0610	.0528	.0610	.0528	.06
Sesquisilicate, drs, c-l, wks .....100 lb.	...	3.05	...	3.05	...	3.05
Silicate, 60°, 55 gal drs, wks .....100 lb.	...	1.70	...	1.70	...	1.70
40°, 55 gal drs, wks 100 lb.	...	.80	...	.80	...	.80
tks, wks .....100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY .....lb.	.05	.05½	.09	.14½	.09	.15
Stannate, 100 lb drs ..lb.	.33½	.36½	.33½	.36½	.33½	.36½
Stearate, bbls .....lb.	.19	.24	.19	.24	.19	.24
Sulfanilate, 400 lb bbls lb.	.16	.18	.16	.18	.16	.18
Sulfate, Anhyd, 550 lb bgs c-l, wks .....100 lb. *t*	1.70	1.90	1.70	1.90	1.70	1.90
Sulfide, 30% cryst, 440 lb. bbls, c-l, wks .....lb.	...	.024	...	.024	...	.024
Solid, 650 lb drs, c-l, wks .....lb.	...	.0315	...	.0315	...	.0315
Sulfite, powd, 400 lb bbls wks .....lb.	...	.05¼	...	.05¼	...	.05¼

s T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y. *t* Bags 15c lower; * Dec. 30. (*PC*) Price Control. (A) Allocation.

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Sodium Sulfocyanide
Triamylamine

Prices

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Sodium (continued):						
Sulfocyanide, drs ....lb.	.55	.65	.55	.65	.55	.65
Sulforicinoleate, bbls ...lb.	...	.12	...	.12	...	.12
Supersilicate (see sodium sesquisilicate)						
Tungstate, tech, crys, kgs lb.	no prices		no prices		no prices	
Sorbitol, drs, wks .....lb.	...	.17¾	...	.17¾	...	.17¾
Spruce, Extract, ord, tks lb.	...	.01½	...	.01½	.01¼	.01½
Ordinary, bbls ....lb.	...	.02½	...	.02½	.01¾	.02½
Super spruce ext, tks ..lb.	...	.01½	...	.01½	...	.01½
Super spruce ext, bbls lb.	...	.02	...	.02	...	.02
Super spruce ext, powd, bags .....lb.	...	.04½	...	.04½	.04	.04½
Starch, Pearl, 140 lb bgs 100 lb.	...	3.10	...	3.10	...	3.10
Powd, 140 lb bgs ..100 lb.	...	3.20	...	3.20	...	3.20
Potato, 200 lb bgs ....lb.	...	.0637	...	.0637	.061	.0637
Imp, bgs .....lb.	no prices		no prices		no prices	
Rice, 200 lb bbls .....lb.	.09	.10	.09	.10	.09	.10
Sweet Potato, 240 lb bbls, f.o.b. plant .....100 lb.	nom.	7.00	nom.	7.00	nom.	7.00
Wheat, thick, bgs .....lb.	...	.05	...	.05	...	.05
Strontium, carbonate, 600 lb bbls, wks .....lb.	no prices		no prices		no prices	
Nitrate, 600 lb bbls, NY lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¾
Sucrose, octa-acetate, den, grd, bbls, wks .....lb.	...	.45	...	.45	...	.45
tech, bbls, wks, ...lb.	...	.40	...	.40	...	.40
SULFUR						
Sulfur, crude, f.o.b. mines ton	...	16.00	...	16.00	...	16.00
Flour, com'l, bgs ..100 lb.	1.90	2.40	1.65	1.95	1.65	1.95
bbls .....100 lb.	1.95	2.50	1.95	2.50	1.95	2.50
Rubbermakers, bgs 100 lb.	...	2.20	...	2.20	2.05	2.20
bbls .....100 lb.	...	2.35	...	2.35	...	2.35
Refine, bgs .....100 lb.	2.45	2.95	...	2.35	...	2.35
Superfine, bgs .....100 lb.	2.65	2.80	2.65	2.80	2.65	2.80
bbls .....100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs .....100 lb.	3.30	3.80	3.05	3.35	3.05	3.35
bbls .....100 lb.	3.65	4.15	3.40	3.70	3.40	3.70
Roll, bgs .....100 lb.	2.65	3.15	2.40	2.70	2.40	2.70
bbls .....100 lb.	2.30	2.85	2.30	2.85	2.30	2.85
Sulfur Chloride, 700 lb drs, wks .....lb.	.03	.08¾	.03	.08	.03	.08
Sulfur Dioxide, 150 lb cyl lb.	.07	.08	.07	.08	.07	.09
Multiple units, wks ...lb.	.04½	.06	.04½	.06	.04½	.07
tks, wks .....lb.	.04	.06	.04	.06	.04	.06
Refrigeration, cyl, wks lb.	.13	.21	.13	.21	.13	.40
Multiple units, wks ....lb.	...	.06½	...	.06½	.06½	.10
Sulfuryl Chloride .....lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd .....ton	no prices		no prices		no prices	
Extract, 42°, bbls .....lb.	...	.08	...	.08	.06¼	.08
Superphosphate, 16% bulk, wks .....ton	10.10	10.74	10.10	10.74	10.10	10.80
Run of pile .....ton	9.60	10.24	9.60	10.24	9.60	10.24
Triple, 40-48%, a.p.a. bulk, wks, Balt. unit .....ton	...	.85	...	.85	.80	.85
T						
Talc, crude, 100 lb bgs, NY ton	...	13.00	12.50	24.50	12.50	24.50
Ref'd 100 lb bgs, NY ton	13.00	21.00	17.25	19.25	17.25	19.25
French, 220 lb bgs, NY ton	no prices		no prices		no prices	
Ref'd, white bgs, NY ton	no prices		no prices		no prices	
Italian, 220 lb bgs to arr ton	no prices		no prices		no prices	
Ref'd, white bgs, NY ton	no prices		no prices		no prices	
Tankage, Grd, NY ....unit u	...	4.60	...	4.60	4.25	4.85
Ungrd .....unit u	...	5.10	...	5.10	5.25	5.70
Fert grade, f.o.b. Chgo unit u	...	5.53	...	5.53	5.60	5.90
South American cif unit u	...	nom.	...	nom.	5.05	5.60
Tapioca Flour, high grade, bgs .....lb.	.04¾	.07¼	.04¾	.07¼	.04	.07¼
Tar Acid Oil, 15%, drs gal.	...	.27½	...	.27½	...	.27½
25% drs (A) .....gal.	...	.31½	...	.31½	...	.31½
Tar, pine, delv, drs ....gal.	.30	.33	...	.33	.32½	.33
tks, delv, E. cities ....gal.	...	.24¼	...	.24½	.24	.24½
Tartar Emetic, tech, bbls lb.	...	.47¾	...	.47¾	...	.47¾
USP, bbls .....lb.	.52¾	.53	.52¾	.53	.52¾	.53
Terpineol, den grade, drs lb.	...	.17	...	.17	...	.17
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachlorethylene, drs, tech lb.	.08	.09½	.08	.09	.08	.09
Tetralene, 50 gal drs, wks lb.	...	.19	...	.19	...	.19
Thiocarbanilid, 170 lb bbls lb.	...	.24	...	.24	...	.24
Tin, crystals 500 lb bbls, wks lb.	.39	.39½	.39	.39½	.39	.39½
Metal, NY (*PC*) (A) ..lb.	...	.52	...	.52	...	.52
Oxide, bbls, wks .....lb.	no prices		...	.55	.55	.57
Tetrachloride, 100 lb drs, wks .....lb.	no prices		no prices		no prices	
Titanium Dioxide, 300 lb bbls (*PC*) .....lb.	...	.14¾	...	.14½	...	.14½
Barium Pigment, bbls ..lb.	.06	.06¼	.05¾	.06½	.05¾	.06½
Calcium Pigment, bbls lb.	.05¾	.06	.05½	.05¾	.05½	.05¾
Titanium tetrachloride, drs, f.o.b. Niagara Falls ....lb.	.32	.45	.32	.45	.32	.45
Titanium trichloride 23% sol, bbls f.o.b. Niagara Falls lb.	.22	.26	.22	.26	.22	.26
20% solution, bbls ... lb.	.175	.215	.175	.215	.175	.215
Toluidine, mixed, 900 lb drs, wks .....lb.	...	.26	...	.26	...	.26
Toluol, drs, wks (*FP*) (A) .....gal.	...	.33	...	.33	...	.33
tks, frt all'd (*FP*) ....gal.	...	.28	...	.28	...	.28
Toner Lithol, red, bbls ...lb.	...	.60	.55	.60	.55	.60
Para, red, bbls .....lb.	...	.70	.70	.75	.70	.75
Toluidine, bgs .....lb.	...	1.05	...	1.05	...	1.05
Triacetin, 50 gal drs, wks, lb.	...	.26	...	.26	...	.26
Triamyl Borate, lcl, drs, wks lb.	...	.33	...	.33	...	.33
Triamylamine, drs, lcl, wks, drs .....lb.	...	1.01	...	1.01	...	1.01

(*FP*) Full Priority. (A) Allocation.

	Current Market		1943 Low	1943 High	1942 Low	1942 High
Tributylamine, lcl, drs, f.o.b. wks ... lb.	...	.81	...	.81	...	.81
Tributyl citrate, drs, frt all'd lb.	.29	.40	...	.34	.24	.34
Tributyl Phosphate, frt all'd lb.	...	.47	...	.47	...	.47
Trichlorethylene, 600 lb drs, frt all'd E. Rocky Mts lb.	(FP)	.08	(FP)	.08	...	.08
Tricresyl phosphate, tech, (FP) ... lb.	.25	.45½	.25	.31	.25	.31
Triethanolamine, 50 gal drs, wks, c-l ... lb.	...	.19	...	.19	...	.19
tks, wks ... lb.	...	.18	...	.18	...	.18
Triethylamine, lcl, drs, f.o.b. wks ... lb.	...	1.16	...	1.16	...	1.16
Triethylene glycol, drs, wks lb.	...	.26	...	.26	...	.26
Trihydroxyethylamine Oleate, bbls ... lb.	...	.30	...	.30	...	.30
Stearate bbls ... lb.	...	.30	...	.30	...	.30
Trimethyl Phosphate, drs, lcl, f.o.b. dest. ... lb.	.54	.56	.54	.56	.54	.56
Trimethylamine, c-l, drs, frt all'd E. Mississippi ... lb.	...	.85	...	.85	...	.85
Triphenylguanidine ... lb.	.58	.60	.58	.60	.58	.60
Triphenyl Phosphate, drs (FP) ... lb.	.31	.32	.31	.32	.31	.32
Tripoli, airfloated bgs, wks ton	...	21.50	...	21.50	21.00	26.00
Turpentine (Spirits), c-l, NY dock, drs ... gal.	...	.71½	...	.75½	.69¼	.82½
Savannah, bbls* ... gal.	.63	.63¾	...	.63¾	.55¼	.70½
Wood Steam dist, drs, c-lcl, NY ... gal.	.64	.67	.64	.67	.61	.80
tks, delv E. cities ... gal.	...	.59	...	.59	.56	.72
Wood, dest dist, cl-lcl, drs, delv E. cities ... gal.	.55	.58	.55	.58	.55	.70
tks, delv E. cities ... gal.	...	.50	...	.50	.50	.58

U

Urea, pure 112 lb cases ... lb.	...	.12	...	.12	...	.12
Fert grade, bgs, c.i.f. S.A. points ... ton	no prices		no prices		no prices	
Dom f.o.b., wks ... ton	...	80.00	...	80.00	...	80.00
Urea Ammonia, liq, nitrogen basis ... ton	...	121.58	...	121.58	...	121.58

V

Valonia beard, 42%, tannin bgs ... ton	no prices		no prices		no prices	
Cups, 32% tannin bgs ton	no prices		no prices		no prices	
Extract, powd, 63% ... lb.	no prices		no prices		no prices	
Vanillin, ex eugenol, 25 lb tins, 2000 lb lots ... lb.	...	2.60	...	2.60	2.00	2.60
Ex-guaiacol ... lb.	...	2.35	...	2.35	...	2.35
Ex-lignin ... lb.	...	2.35	...	2.35	...	2.35
Vermilion, English, kgs ... lb.	3.12	3.17	3.12	3.17	3.12	3.17

W

Wattle Bark, bgs ... ton	41.00	43.00	41.00	43.00	41.00	43.00
Extract, 60°, tks, bbls lb.	.04475	.046	.04475	.046	.04475	.0475
Wax, Bayberry, bgs ... lb.	.25	.26	.18	.20	.18	.20
Bees, bleached, white 500 lb slabs, cases ... lb.	...	.52½	...	.61	.58	.61
Yellow, African, bgs lb.	...	.37½	...	.49	...	.49
Brazilian, bgs ... lb.	...	.44¾	...	.50	...	.50
Refined, 500 lb slabs, cases lb.	.52½	.58½	.59	.60	.55	.60
Candelilla, bgs ... lb.	...	.38	...	.38	.33	.38
Carnauba, No. 1, yellow, bgs ... lb.	...	.83¼	...	.83¼	.83¼	.89
No. 2, yellow, bgs ... lb.	...	.81¼	...	.81¼	.81¼	.88
No. 2, N. C., bgs ... lb.	...	.75¾	.75¾	.85	.75¾	.85
No. 3, Chalky, bgs ... lb.	...	.71¼	.71¼	.78	.71¼	.78
No. 3, N. C., bgs ... lb.	.76¾	.80	.75½	.79	.74½	.79
Ceresin, dom, bgs ... lb.	.13½	.14	.13½	.14	.13½	.14
Japan, 224 lb cases ... lb.	no stocks		no stocks		.30	.45
Montan, crude, bgs ... lb.	.46	.46	.45	.46	.45	.46
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.26	.27	.26	.27	.24	.27
Cakes, cases ... lb.	.27	.28	.27	.28	.25	.28
Wood Flour, c-l, bgs ... ton bgs, c-l, wks ... ton	20.00	32.00	24.00	25.00	24.00	25.00
Whiting, chalk, com 200 lb	18.00	22.00	18.00	22.00	18.00	22.00
Gilders, bgs, c-l, wks ... ton	20.00	24.00	20.00	24.00	16.00	24.00

X

Xylol, frt all'd, East 10° tks, wks ... gal.	...	.27	...	.27	...	.27
Com'l tks, wks, frt all'd gal.	...	.27	...	.27	...	.27
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.35	.36

Z

Zein, bgs, 1000 lb lots, wks ... lb.	...	.25	...	.25	.20	.25
Zinc Acetate, tech, bbls, lcl, delv ... lb.	.16	.17	.16	.17	.16	.17
Arsenite, bgs, frt all'd lb.	...	.12	...	.12	...	.12
Carbonate tech, bbls, NY lb.	.14	.20	.14	.20	.14	.20
Chloride fused, 600 lb drs, wks ... lb.	...	.05	...	.05	...	.05
Gran, 500 lb drs, wks lb.	...	.0575	...	.0575	...	.0575
Soln 50%, tks, wks 100 lb.	...	2.50	...	2.50	...	2.50

(FP) Full priority. (PC) Price Ceiling. Dec. 30 price.

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BOUND BROOK NEW JERSEY

Prices Current

		Current Market	1943 Low	1943 High	1942 Low	1942 High
Zinc (continued):						
Cyanide, 100 lb drs	lb.	.33	.33	.37	.33	.37
Dust, 500 lb bbls, c-l, delv	lb.	...	...	.1035	...	.1035
Metal, high grade slabs, c-l, NY (*FP*) (*PC*)	1000 lb.	...	8.66	8.66	...	8.65
E. St. Louis	100 lb.	...	8.25	8.25	...	8.25
Oxide, Amer, bgs, wks	lb.	...	.07¼	.07¼	...	.07¼
French 300 lb bbls, wks	lb.	...	.07¼	.07¼	...	.07¼
Palmitate, bbls	lb.	.32	.33	.33	.32	.33
Resinate, fused, pale bbls	lb.	.11	.12	.12	.10	.12
Stearate, 50 lb bbls	lb.	.30	.32	.31	.30	.31
Sulfate, crys, 40 lb bbls wks	lb.	...	.385	.360	.360	.365
Flake, bbls	lb.	...	.435	.410	.405	.410
Sulfide, 500 lb bbls, delv	lb.	...	.08½	.08½	.08	.08½
bgs, delv (*PC*)	lb.	.08¼	.08½	.14¼	.14	.14¼
Sulfocarbolate, 100 lb kgs	lb.	.26	.31	.25	.24	.29
Zirconium Oxide, crude, 70-75% grd, bbls, wks	ton	75.00	100.00	100.00	75.00	100.00

Oils and Fats

Babassu, tks, futures	lb.	...	.111	.111	no prices	
Castor, No. 3, 400 lb drs	lb.	...	.13¾	.13¾	.12½	.13¾
(A) (*PC*) Blown, 400 lb drs	lb.	...	.15¼	.15¼	.14	.15¼
China Wood, drs, spot NY	lb.	...	.39	.39	.39	.40⅛
tks, spot NY	lb.	...	.3875	.3875	.3875	...
Coconut, edible, drs NY	lb.	...	.0985	.0985	...	...
Manila, tks, NY	lb.	...	.0835	.0835	...	...
tks, Pacific Coast	lb.	no prices		no prices	no prices	
Cod, Newfoundland, 50 gal bbls	gal.	...	.90	.90	.85	.90
Copra, bgs, NY	lb.	no prices		no prices	no prices	
Corn, crude, tks, mills	lb.	...	.12¾	.12¾ nom.	.12½	.12¾
Refd, 375 lb bbls, NY	lb.	.15½	nom.	.15½ nom.	.15	.15½
Degras, American, 50 gal bbls, NY	lb.	.10	.12	.12½ nom.	.11½	.12½
Greases, Yellow	lb.	...	.0929	.0929	...	.0929
White, choice, bbls, NY	lb.	...	.08¾	.097	...	.097
Lard, Oil, Edible, prime	lb.	...	.16	.16	.15½	.16
Extra, bbls	lb.	...	.15¼	.15¼	.15	.15¼
Extra, No. 1, bbls	lb.	...	.14½	.14½	.14½	.14⅝
Linseed, Raw less than 5 drs lots	lb.	.146	.148	.14	.125	.149
drs, c-l, spot	lb.	.138	.140	.132	.132	.117 .143
tks	lb.	.134	.136	.128	.130	.108 .134
Menhaden, tks, Baltimore	gal.	...	.088	.089	.63¾	.666
Refined, alkali, drs	lb	.127	.129	.127	.129	.12 .129
Kettle boiled, drs	lb.	.137	.139	.137	.139	.13 .139
Light pressed, drs	lb.	.117	.119	.117	.119	.11 .139
tks	lb.	.100	.11	.109	.11	.102 .11
Neatsfoot, CT, 20°, bbls, NY	lb.	nom.	.25¾	nom.	.25¾	... .25¾
Extra, bbls, NY	lb.	nom.	.14⅞	nom.	.14⅞	... .14⅞
Pure, bbls, NY	lb.	.18¼	nom.	nom.	.18¼	.17¾ .19¼
Oiticica, bbls	lb.	.23	.25	.23	.25	.29 .25
Oleo, No. 1, bbls, NY	lb.	.13¼	nom.	nom.	.13¼	... .13¼
No. 2, bbls, NY	lb.	...	.13	...	.13	... .13
Olive, denat, bbls, NY	gal	3.50	4.00	3.50	4.00	3.50 4.50
Edible, bbls, NY	gal	4.35	4.50	4.00	4.25	4.00 5.50
Foots, bbls, NY	lb	.19	nom.	.19	nom.	.19 .20
Palm, Kernel, bulk	lb	no prices		no prices	no prices	
Niger, cks	lb	...	.0825	...	.0825	.0925 ...
Sumatra, tks	lb.	no prices		no prices	no prices	
Peanut, tks, f.o.b. mill	lb.	...	.13	...	.13	.12⅞ .13
Refined, bbls, NY	lb	.16½	nom.	.17	nom.	.16¾ .17
Perilla, drs, N Y (A)	lb	...	.245	...	.246	... .246
tks, Coast	lb.	...	.2380	...	.2380	... .2380
Pine, see Pine Oil, Chem Sec						
Rapeseed, blown, bbls, NY	lb	.18	.18½	.18	.18½	.18 .18½
Denatured, drs, NY	gal	...	nom.	...	nom.	... nom.
Red, Distilled, drs	lb	.12¾	.13¾	.11¾	.13½	.11¾ .143
tks	lb	...	.12	.11	.11¾	.11 .12½
Sardine, Pac Coast, tks	gal.	.0890	...	.0890	...	.66½ nom.
Refined alkali, drs	lb.	.127	.129	.127	.129	.12 .129
Light pressed, drs	lb	.117	.119	.117	.119	.11 .119
tks	lb.	.109	.11	.109	.11	.102 .11
Soy Bean, crude						
Dom, tks, f.o.b. mills	lb	...	.1175	.12¼ nom.	.12¼ nom.	
Crude, drs, NY	lb	.13	...	.13	...	.13 nom.
Ref'd, drs, NY	lb	.1389	.1400	.14¼ nom.	.14¼ nom.	
tks	lb	...	.134	.13½ nom.	.13½ nom.	
Sperm, 38° CT, bleached (*FP*) bbls, NY (A)	lb	...	.1301	.1301	...	.1301 nom.
45° CT, blchd, bbls, NY	lb	...	.1278	.1278	...	.1278 nom.
Stearic Acid, double pressed dist bgs	lb.	.14½	.15½	.14	.15¾	.14 .16½
Double pressed saponified bgs	lb	.15¼	.16¾	.15¼	.16¾	.15¼ .16¾
Triple pressed dist bgs	lb.	.17½	.18½	.17	.18¾	.17 .19½
Stearine, Oleo, bbls	lb	...	.11	...	.11	... .11
Tall, crude, drs, c-l, wks	ton	...	55.00	...	55.00	40.00 55.00
tks, wks	ton	...	40.00	...	40.00	30.00 40.00
dist, drs, c-l, delv	lb.	...	.05	...	.05	.04 .05
tks, wks	lb	...	.04½	...	.04½	.03½ .04½
Tallow City, extra loose	lb.	...	.097¼	...	.097¼	... .097¼
Edible, tierces	lb.	no prices		no prices	no prices	
Acidless, tks, NY	lb.	...	.13¾	.13 nom.	.13	nom.
Turkey Red, single, drs	lb.	...	.08¾	...	.08¾	... .08¾
Double bbls	lb	...	.12	...	.12	... .12
Whale:						
Winter bleach, bbls, NY	lb.	...	.1110	...	.1110	... .1110
Refined, nat, bbls NY	lb.	...	.1070	...	.1070	... .1070

(*FP*) Full Priority. (*PC*) Price Control. (A) Allocation.
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Chemurgy and the War

(*Continued from page 192*)

tonseed hulls, and cereal straws, to mention a few. The pentosan content ranges from 20 to 32 per cent in these materials, of which 50 to 75 per cent can be recovered as furfural by treatment with sulfuric acid. The shortage will tend to absorb some farm waste.

A 25 per cent yield of vanillin is commercially obtained by treating lignin with nitrobenzene and alkali. Cellulosic farm waste contains 11 to 34 per cent of lignin, so that a tremendous, cheap source for this chemical is at hand. At present, 800,000 pounds are used, mainly to flavor food. In this field lignin vanillin has already driven the synthetic product off the market. New outlets, as in the synthesis of alkaloids, and in plastics, are probable.

Acknowledgment

Thanks are due to Dr. Herbert Fineberg for his help on the topics of Alcohol and Synthetic Rubber, Rubber Substitutes and Solvents.

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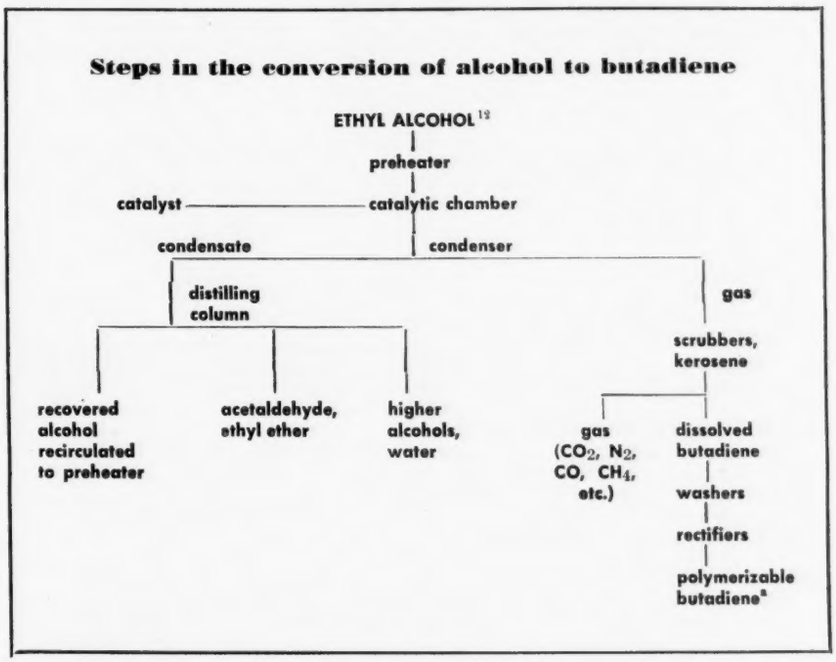
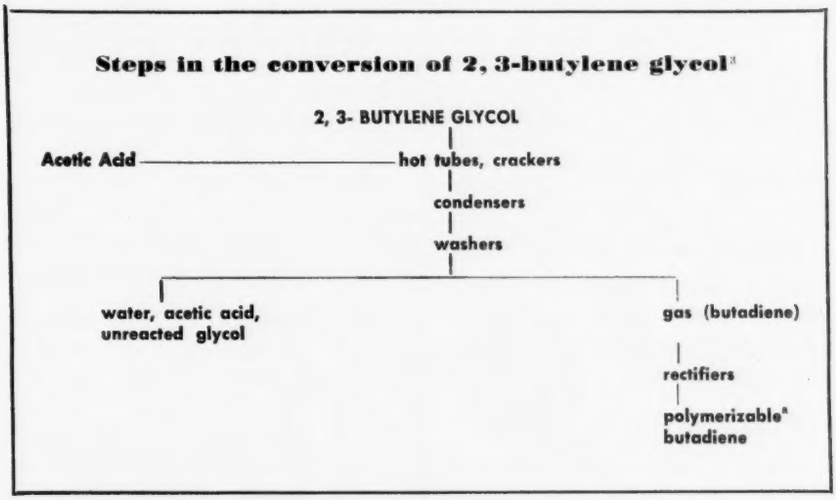
Figure 3



[a] This butadiene is only 78% pure and is suitable directly for bulk polymerization, but not for emulsion work.

Figure 4



[a] Pure butadiene suitable for emulsion polymerization.

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Anti-Freeze—Methanol and Alcohol

CRUDE SULPHUR

99½% PURE

Free From
ARSENIC, SELENIUM AND TELLURIUM

TEXAS GULF SULPHUR COMPANY
(INCORPORATED)
75 East 45th St., New York City
Deposits and Plants: Newgulf and Long Point, Texas

STEARATES

ZINC STEARATE
CALCIUM STEARATE
ALUMINUM STEARATE
MAGNESIUM STEARATE

Stocks at

NEW YORK ST. LOUIS DALLAS SAN FRANCISCO
CHICAGO KANSAS CITY LOS ANGELES SEATTLE

FRANKS CHEMICAL PRODUCTS CO.
BLDG. 9, BUSH TERMINAL — BROOKLYN, N.Y.

PHOSPHORIC ACID

75% PURE FOOD GRADE

PM Since 1905

An acid made from our own high quality electric furnace phosphorus.

ELEMENTAL YELLOW PHOSPHORUS of very high quality produced by electric furnace reduction of phosphorus rock from our own mines. Shipments in drums, either solid or wedges.

"ELECTROPHOS." A superior quality triple superphosphate of over 48% available P_2O_5.

THE PHOSPHATE MINING CO

110 WILLIAM STREET, NEW YORK • NICHOLS, FLORIDA

"WE"-EDITORIALLY SPEAKING

Our hats are off to those female workers who continued to package an essential chemical needed badly by the North African Expedition, despite the fact that they knew they would be burned badly. Happily a solution to the problem has been found. There are heroes on the production lines, too!

All editors and reporters know that occasionally, but not often, "the tail wags the dog." Well, when the officers of the National Federation of Federal Employees admit publicly "there can be no blinking of the fact that there are too many federal employees" we certainly have a canine operating directly in reverse.

Quotations from the press:

"When the war ends our society will be almost completely industrialized. It will be an age of chemistry and machines. Brains will do even more of the work of brawn." Eric Johnston, President, U. S. Chamber of Commerce.

"Where wartime substitutes appear to be only temporary stopgaps, entirely different chemical products can be made after the war by applying technical knowledge learned in the emergency." Dr. Emil Ott, Research Director, Hercules Powder Co.

"The nation's technologists must solve, in the next seven months, the problems of adequate synthetic rubbers that the Germans have not solved in seven years." W. L. White, Research Director, Manhattan Rubber Division of Raybestos-Manhattan, Inc., and member of the Advisory Committees of both WPB and Rubber Reserve.

"There are now more than 35,000 interested third parties to labor-management squabbles." Captain E. B. Moran, naval hero and commander, U. S. S. *Boise*.

"For a time the merits of the refinery conversion program were pretty well bogged down in arguments as to just what percentage of new equipment would be necessary. . . . That delay was unfortunate because it was obvious then, just as it is now, that whatever amount of new construction material would be required would still be less than that required to build a new plant." Bruce K. Brown, Assistant Deputy Petroleum Administrator.

Priorities
Allocations
Price Controls

See the Statistical and Technical Data Section (Part 2 of this issue) for monthly digest of Government Regulations of Materials and Prices. Invaluable to you in your work.

Demand for protective coatings for military equipment in 1942 was five times greater than the consumption for this purpose in 1941. Bad news for the Austrian paperhanger who should know his coatings.

The 1942 production of plastics totalled over 200,000 tons. And it is but a few years back that we were blithely stating that the plastics field was a poundage rather than a tonnage industry. Output has expanded 650 per cent in the period between 1929 and 1941, as compared with a 42 per cent increase for all industry in the same period.

Fifteen Years Ago

From Our Files of February, 1928

Stanco, Inc., is formed to produce petroleum specialties.

Sun Oil Company reported entering sulfur producing field.

Wishnick-Tumpeer, Inc., purchases Century Chemical.

B. J. Gogarty joins sales staff of Rossville.

L. A. Watt, Monsanto, elected chairman of St. Louis Section, A. C. S.

Philadelphia Quartz acquires Frohman Chemical.

A group of Ohio farmers have purchased a gasoline refinery located in Texas. We wonder when the war is over if they will be mixing gasoline with grain alcohol for motor fuel purposes.

The Philadelphia Electric Co. reports that paint can cut industrial accidents and at the same time increase the visibility for workers by as much as 100 per cent. Working with du Pont chemists it was found that by utilizing different paint combinations on walls and ceilings and also on machinery and equipment the entire interior could be transformed into a giant light reflector. A scientific approach and thorough knowledge of the theory of reflected light is, of course, the explanation.

Chemists are now represented in the WAACS by Anahid Kurkjian. "I thought," said she, "I could accomplish more as a WAAC. The Army needs dozens of chemists." Well, so does industry for that matter. According to newspaper reports, Miss Kurkjian, chemist and perfumist, has been assigned to the Aircraft Warning Service on the east coast.

To provide jobs for 55 million in the postwar period the nation must produce and sell an annual output worth between 135 and 150 billion dollars, or 35 to 50 per cent more than in 1940 when the national income approximated 100 billion dollars.

Recent newspaper headline—"Kirkpatrick Plays on Harpsichord." No, it was not our "Sid."

Recent newspaper headline in *The New York Times*—"No prospect of Rise in Supply of Butter Until Cows Give More Milk." Those clever copywriters and illustrators should get Elsie back where she belongs on the production line in this emergency.

Sodium Hydroxide CHIP—a new, more *convenient* physical form—is now available through the Baker & Adamson Division of the General Chemical Company, both in Reagent A.C.S. and U.S.P. grades. This new physical form was especially developed to facilitate easy weighing and handling! Study its many advantages—then order it for your laboratory today!

LOOK AT THESE IMPORTANT ADVANTAGES

- Economically advantageous to use.
- Easily soluble, because of its small, uniform particle size. Practical! Convenient!
- Unusually convenient to weigh and handle.
- Can be readily ground to powder form.
- Fuses readily with other chemicals.

When Ordering Sodium Hydroxide, Specify Baker & Adamson CHIP

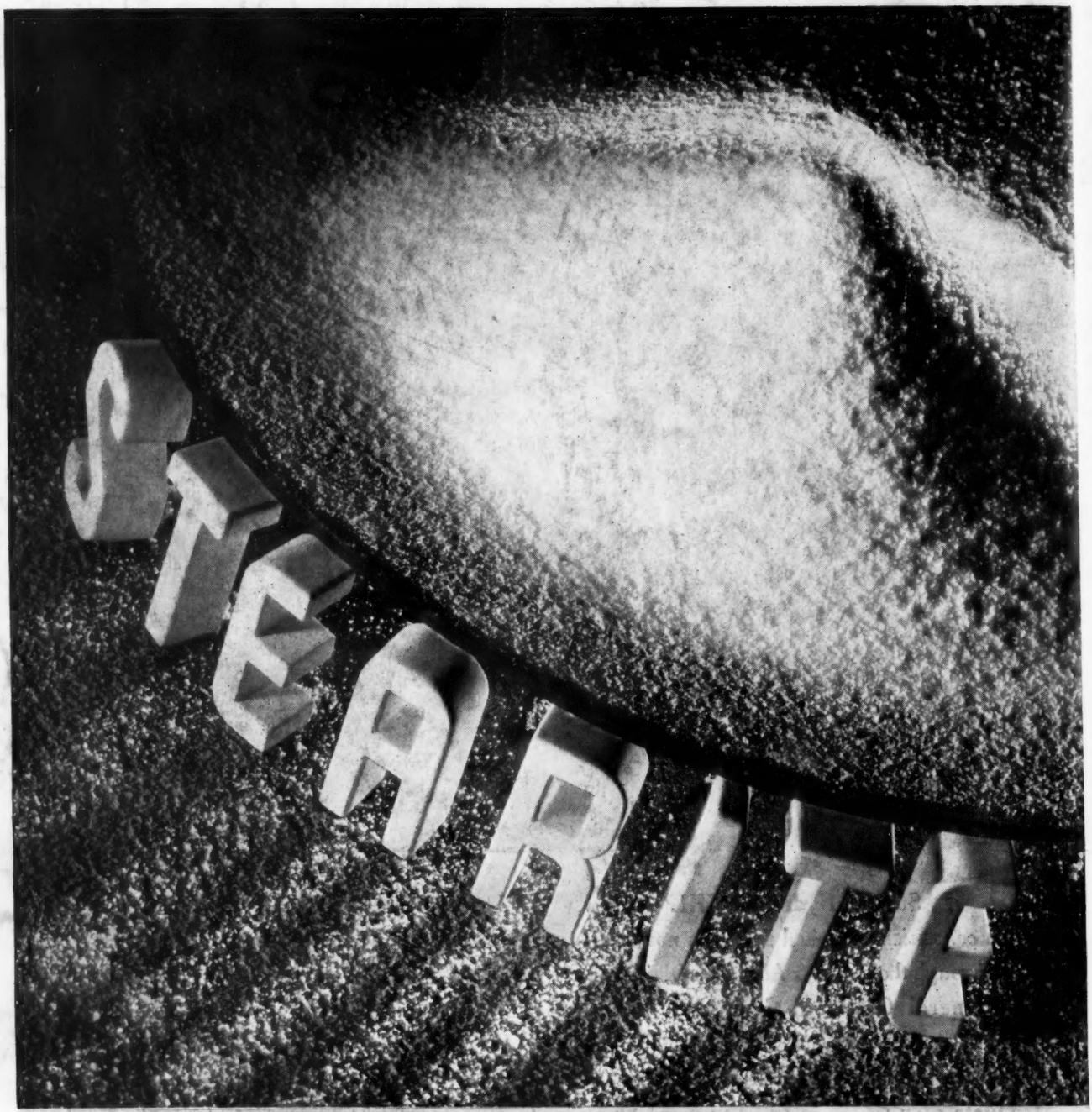
Reagent ACS Grade • Code 2249
1 and 5 lb. bottles • 10 and 25 lb. cans
For Industrial Applications:
100 and 400 lb. drums

Also: U.S.P. Grade • Code 2251
1 and 5 lb. bottles • 10 and 25 lb. cans
For Industrial Applications:
100 and 450 lb. drums

WRITE TODAY FOR PRICES ON THE NEW CHIP GRADES!

GENERAL CHEMICAL COMPANY
40 RECTOR STREET, NEW YORK, N. Y.

Technical Service Offices: Atlanta • Baltimore • Boston • Bridgeport (Conn.) • Buffalo Charlotte (N. C.) • Chicago • Cleveland • Denver • Detroit • Houston • Kansas City Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh • Providence (R. I.) St. Louis • Utica (N. Y.)
Pacific Coast Technical Service Offices: San Francisco • Los Angeles
Pacific Northwest Technical Service Offices: Wenatchee (Wash.) • Yakima (Wash.)
In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver



WITCO STEARITES have established their superiority over stearic acid in many applications over a period of years. Because they are produced by the selective hydrogenation of unsaturated oils, they have the uniformity of a manufactured product and thus may be used with more certainty of uniform results. Among the applications in which they are being used are: as an ingredient in polisher and platers' polishing compounds; as a dispersing agent, softener and accelerator activator in rubber; as a water repellent in varnishes and plastics; as a base for the production of stearates—and in chemical manufacture. You are invited to consult with our staff regarding the use of Witco Stearites for your special purposes.

WISHNICK-TUMPEER, INC.

MANUFACTURERS AND EXPORTERS

New York, 295 Madison Avenue • Boston, 141 Milk Street • Chicago, Tribune Tower • Cleveland, 616 St. Clair Avenue, N. E. • Witco Affiliates: The Pioneer Asphalt Company • Panhandle Carbon Company
Foreign Office, London, England

WITCO

TECHNOLOGY DEPT.

State of Chemical Trade

Current Statistics (January 31, 1943)—p. 121

PUBLIC LIBRARY MAR 3 1943

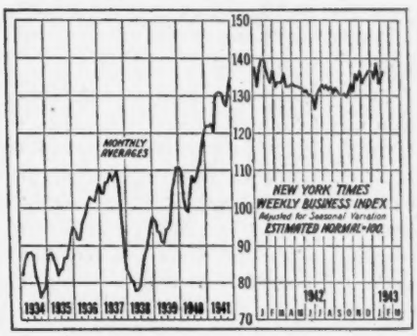
WEEKLY STATISTICS OF BUSINESS

Week Ending	Carloadings 1943	Carloadings 1942	Carloadings % of Change	Electrical Output* 1943	Electrical Output* 1942	Electrical Output* % of Change	Jour. of Com. Price Index	Nat'l Chem. & Drugs	Fertilizer Fats & Oils	Ass'n Price Indices Fert. Mat.	Mixed Fert.	All Groups	†Labor Dept. Chem. & Drug Price Index	% Steel Activity	N.Y. Times Index Bus. Act.	Fisher Commodity Index
Jan. 2	621,048	676,534	— 8.2	3,779,993	3,288,685	+14.9	106.2	127.6	150.2	117.6	115.3	132.4	99.5	98.2	136.8	109.8
Jan. 9	716,272	736,972	— 2.8	3,952,587	3,472,579	+13.8	106.9	127.6	150.2	117.6	115.3	133.4	99.5	97.0	134.7	109.3
Jan. 16	755,369	811,327	— 6.9	3,952,479	3,450,468	+14.5	106.9	127.6	148.5	117.6	115.3	133.7	99.5	99.3	138.8	110.1
Jan. 23	703,578	818,081	—14.0	3,974,202	3,440,163	+15.5	107.0	127.6	148.5	117.6	115.3	133.9	99.5	99.8	133.3	110.2

MONTHLY STATISTICS

CHEMICAL:	Oct. 1942	Oct. 1941	Sept. 1942	Sept. 1941	Aug. 1942	Aug. 1941
Acid, sulfuric (expressed as 50° Baumé, short tons, Bureau of the Census)						
Total prod. by fert. mfrs.	No Longer Available		.....	.....	.....	.....
Consumpt. in mfr. fert.	.....	.....	.....	.....	.....	.....
Stocks end of month	.....	.....	.....	.....	.....	.....
Alcohol, Industrial (Bureau Internal Revenue)						
Ethyl alcohol prod., proof gal..	No Longer Available		.....	.....	.....	.....
Comp. denat. prod., wine gal...	.....	.....	.....	.....	.....	.....
Removed, wine gal.	.....	.....	.....	.....	.....	.....
Stocks end of mo., wine gal...	.....	.....	.....	.....	.....	.....
Spec. denat. prod., wine gal. ..	.....	.....	.....	.....	.....	.....
Removed, wine gal.	.....	.....	.....	.....	.....	.....
Stocks end of mo., wine gal...	.....	.....	.....	.....	.....	.....
Ammonia sulfate prod., tons *a*..	No Longer Available		.....	.....	.....	.....
Benzol prod., gal. *b*	No Longer Available		.....	.....	.....	.....
Byproducts coke, prod., tons *a*..	.....	.....	.....	.....	.....	.....
Cellulose Plastic Products (Bureau of the Census)						
Nitrocellulose sheets, prod., lbs.	.....	.....	.....	.....	.....	.....
Sheets, ship., lbs.	.....	.....	.....	.....	.....	.....
Rods, prod., lbs.	.....	.....	.....	.....	.....	.....
Rods, ship., lbs.	.....	.....	.....	.....	.....	.....
Tubes, prod., lbs.	.....	.....	.....	.....	.....	.....
Tubes, ship., lbs.	.....	.....	.....	.....	.....	.....
Cellulose acetate, sheets, rods, tubes						
Production, lbs.	.....	.....	.....	.....	.....	.....
Shipments, lbs.	.....	.....	.....	.....	.....	.....
Molding comp., ship.; lbs. ..	.....	.....	.....	.....	.....	.....
Methanol (Bureau of the Census)						
Production, crude, gals.	No Longer Available		.....	.....	.....	.....
Production, synthetic, gals. ...	.....	.....	.....	.....	.....	.....
Pyroxylin-Coated Textiles (Bureau of the Census)						
Light goods, ship., linear yds...	2,806,551	4,285,874	2,607,510	.....	2,775,381	4,357,029
Heavy goods, ship., linear yds..	2,080,092	3,555,574	2,009,628	.....	1,872,926	3,345,544
Pyroxylin spreads, lbs. *e*	4,564,668	7,288,494	4,766,437	.....	4,202,140	7,143,642
Exports (Bureau of Foreign & Dom. Commerce)						
Chemicals and related prod. *d*..	Exports and Imports No Longer Available					
Crude sulfur *d*	.....	.....	.....	.....	.....	.....
Coal-tar chemicals *d*	.....	.....	.....	.....	.....	.....
Industrial chemicals *d*	.....	.....	.....	.....	.....	.....
Imports						
Chemicals and related prod. *d*..	.....	.....	.....	.....	.....	.....
Coal-tar chemicals *d*	.....	.....	.....	.....	.....	.....
Industrial chemicals *d*	.....	.....	.....	.....	.....	.....
Employment (U. S. Dept. of Labor, 3 year av., 1923-25=100) Adjusted to 1937 Census Totals						
Chemicals and allied prod., including petroleum	.....	.....	163.4	147.6	159.9	143.1
Other than petroleum	.....	.....	170.6	152.5	166.0	146.7
Chemicals	.....	.....	193.2	182.4	194.4	180.1
Explosives	.....	.....	No Longer Available		.....	.....
Payrolls (U. S. Dept. of Labor, 3 year av., 1923-25=100) Adjusted to 1937 Census Totals						
Chemicals and allied prod., including petroleum	.....	.....	246.0	188.5	237.4	181.5
Other than petroleum	.....	.....	260.6	195.4	252.2	183.4
Chemicals	.....	.....	307.4	250.9	309.1	247.2
Explosives	No Longer Available		.....	.....	.....	.....
Price index chemicals*	96.2	88.4	96.3	96.5	96.3	96.5
Drugs & Pharmaceuticals* ...	128.8	124.1	128.9	129.1	129.0	129.1
Fert. mat.*	78.3	77.3	78.3	78.5	78.3	78.4
Paint and paint mat.	101.0	96.0	100.4	100.7	100.1	100.3
FERTILIZER:						
Exports (long tons, Nat. Fert. Association)						
Fertilizer and fert. materials ..	Exports and Imports No Longer Available					
Total phosphate rock	.....	.....	.....	.....	.....	.....
Total potash fertilizers	.....	.....	.....	.....	.....	.....
Imports (long tons, Nat. Fert. Association)						
Fertilizer and fert. materials ..	.....	.....	.....	.....	.....	.....
Sodium nitrate	.....	.....	.....	.....	.....	.....
Total potash fertilizer	.....	.....	.....	.....	.....	.....

INDUSTRIAL TRENDS



Business: The industrial and business structure continued to shape up well during the past month. The proportion of effort devoted to war production is still growing at the expense of civilian industries. Even so the total manufacturing volume has expanded. Orders still exceed production in most industries.

According to the Federal Reserve Board production in December showed less than the usual decline from November and the Board's seasonally adjusted index rose two points further to 196.

The *New York Times* index of business activity fluctuated considerably during the month ranging from 133.3 to 138.8.

Steel: Production during the month of January totaled 7,408,144 net tons at a rate of 97.8 per cent of capacity, compared with a production of 7,124,922 in January, 1942, at a rate of 94.7.

Demand for steel products still outstrips production. Scrap supplies are still showing improvement and there have been no complaints recently on the part of operators regarding the scrap problem. It is felt in the industry that the only thing that can seriously slow down production is the necessity for furnace repairs which are even now past due.

Carloadings: During December freight carloadings declined about the usual seasonal amount as indicated by the Federal Reserve Board's adjusted index which remained at 134 per cent of the 1935-39 average. Grain, livestock, and miscellaneous loadings rose somewhat on a seasonally adjusted basis, while coal and other products declined slightly.

During the four weeks of January the number of cars loaded fell off about 8 per cent from last year.

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Electric Output: During the four weeks of January electric power production in the United States averaged about 14.6 per cent better than the corresponding period of 1942. In the week ended January 30 a new high record was made with a production of 3,976,844,000 kilowatt hours of energy. The previous record was 3,975,873,000 kilowatt hours set in the week ended December 19, 1942.

Construction: The value of construction was 3.2 billion dollars in the fourth quarter of 1942, according to preliminary estimates of the Department of Commerce. This was about 25 per cent lower than the peak of 4.3 billion reached in the previous quarter, but slightly higher than that of the fourth quarter of 1941. Installations for direct military use and industrial facilities accounted for almost three-quarters of the total, and residential building contributed somewhat less than half of the remainder. For the year as a whole, construction is valued at 13.6 billion dollars—of which almost four-fifths was publicly financed—an increase of one-fifth over 1941. The increase took place entirely in military and industrial projects, which rose 4.4 billion dollars. All other types of construction declined.

Retail Trade: Retail store sales in the U. S. during 1942 totaled 56,382 million dollars, a record high mark. However this represented an increase of but 4 per cent over 1941 the smallest increase since 1938. The 4 per cent dollar sales increase of 1942 does not give a complete picture of the situation as this rise is less than the rise in retail prices. Physical volume of trade as measured by sales adjusted for price changes declined 8 per cent.

Commodity Prices: Prices of agricultural commodities advanced sharply from the early part of December to the middle of January. Maximum prices designed to restrict further increases were issued for some of these commodities, including corn and mixed feeds. For certain other products, however, like potatoes and truck crops, Federal price supports were increased. Wholesale prices of most other commodities continued to show little change.

From mid-November to mid-December retail food prices advanced 1.6 points to about 133 per cent of the 1935-39 average. Further increases in these prices are indicated in January as a result of advances permitted recently in maximum levels for such items as flour, milk, and poultry.

MONTHLY STATISTICS (cont'd)

FERTILIZER, (Cont'd)	Oct. 1942	Oct. 1941	Sept. 1942	Sept. 1941	Aug. 1942	Aug. 1941
Superphosphate e (Nat. Fert. Association)						
Production, total	.....	.....	.....	.....	413,300	334,090
Shipments, total	.....	.....	.....	.....	373,196	223,978
Northern area	.....	.....	.....	.....	249,914	127,362
Southern area	.....	.....	.....	.....	123,283	96,716
Stocks, end of month, total	.....	.....	.....	.....	1,212,490	1,223,183
Tag Sales (short tons, Nat. Fert. Association)						
Total, 17 states	.....	.....	231,427	204,039	213,238	180,437
Total, 12 southern	.....	.....	176,033	135,239	69,054	71,863
Total, 5 midwest	.....	.....	61,394	68,800	146,184	108,775
Fertilizer employment *i*	.....	.....	110.6	110.2	97.5	89.6
Fertilizer payrolls *i*	.....	.....	137.3	111.6	121.0	90.8
GENERAL:						
Acceptances outst'd'g *f*	.....	.....	.....	.....	.....	.....
Coal prod., anthracite, tons	.....	.....	.....	.....	.....	.....
Coal prod., bituminous, tons	.....	.....	.....	.....	.....	.....
Com. paper outst'd'g *f*	.....	.....	.....	.....	.....	.....
Failures, Dun & Bradstreet	.....	.....	.....	.....	.....	.....
Factory payrolls *i*	.....	.....	220.5	162.6	214.7	133.1
Factory employment *i*	.....	.....	148.2	135.2	145.9	158.1
GENERAL MANUFACTURING:						
Automotive production	No Longer Available		.....	.....	.....	.....
Boot and shoe prod., pairs	39,823,292	45,704,342	38,586,091	45,464,736	38,586,091	45,464,736
Bldg. contracts, Dodge *i*	.....	.....	.....	.....	.....	.....
Newsprint prod., U. S. tons	.....	.....	77,962	78,657	.....	83,592
Newsprint prod., Canada, tons	.....	.....	257,618	298,276	.....	293,054
Glass containers ,gross‡	.....	.....	.....	.....	6,584	6,791
Plate glass prod., sq. ft.	.....	.....	4,742,000	14,905,000	3,883,000	14,125,000
Window glass prod., boxes	.....	.....	.....	.....	1,075,343	1,267,473
Steel ingots prod., tons	7,584,864	7,236,068	7,067,084	6,811,754	7,223,451	6,997,490
% steel capacity	100.1	98.9	96.5	96.3	95.4	95.6
Pig iron prod., tons	No Longer Available		.....	.....	.....	.....
U.S. cons'pt. crude rub., lg. tons	No Longer Available		.....	.....	.....	.....
Tire shipments	No Longer Available		.....	.....	.....	.....
Tire production	No Longer Available		.....	.....	.....	.....
Tire inventories	No Longer Available		.....	.....	.....	.....
Cotton consumpt., bales	972,490	955,657	966,149	877,971	925,089	872,086
Cotton spindles oper.	.....	.....	22,956,234	22,977,528	22,973,572	23,029,066
Wool consumption *s*	.....	.....	48.4	58.6	49.9	53.5
Rayon deliv., lbs.	53,700,000	41,700,000	38,400,000	37,000,000	38,100,000	37,300,000
Rayon employment *i*	.....	.....	310.6	327.0	307.3	329.3
Rayon payrolls *i*	.....	.....	402.5	374.3	400.4	368.2
Soap employment *i*	.....	.....	84.7	98.2	81.6	97.4
Soap payrolls *i*	.....	.....	134.1	139.6	126.5	83.4
Paper and pulp employment *i*	.....	.....	118.8	128.4	119.5	127.8
Paper and pulp payrolls *i*	.....	.....	163.6	163.0	165.1	121.5
Leather employment *i*	.....	.....	88.8	97.0	88.3	94.8
Leather payrolls *i*	.....	.....	117.3	114.2	116.7	109.0
Glass employment *i*	.....	.....	119.1	130.3	117.9	130.0
Glass payrolls *i*	.....	.....	151.9	160.5	157.3	155.4
Rubber prod. employment *i*	.....	.....	107.4	111.5	105.1	111.8
Rubber prod. payrolls *i*	.....	.....	157.6	134.8	154.0	138.8
Dyeing and fin. employment *i*	.....	.....	129.2	136.0	127.1	136.3
Dyeing and fin. payrolls *i*	.....	.....	151.4	135.7	148.3	132.5
MISCELLANEOUS:						
Gasoline prod., *p*	.....	.....	.....	.....	.....	.....
Cottonseed oil consumpt., bbls.	.....	.....	.....	.....	.....	.....
PAINT, VARNISH, LACQUER, FILLERS:						
Sales 580 establishments, dollars	$44,121,665	$51,138,488	$43,027,934	$50,363,488	$41,105,740	$48,646,514
Trade sales (580 estabts.) dollars	$21,279,899	$24,724,475	$20,539,579	$25,624,958	$20,187,334	$23,893,291
Industrial sales, total, dollars	$17,906,344	$21,453,628	$17,242,815	$19,799,134	$16,748,036	$20,246,764
Paint & Varnish, employ. *i*	.....	.....	125.6	143.9	125.6	144.8
Paint & Varnish, payrolls *i*	.....	.....	163.6	169.9	162.8	171.5

a Bureau of Mines; *b* Crude and refined plus motor benzol, Bureau of Mines; *c* Based on 1 lb. of gun cotton to 7 lbs. of solvent, making an 8-lb. jelly; *d* 000 omitted, Bureau of Foreign & Domestic Commerce; *e* Expressed in equivalent tons of 16% A.P.A.; *f* 000,000 omitted at end of month; *i* U. S. Dept. of Labor, 3 year average, 1923-25 = 100, adjusted to 1937 Census totals; *j* 000 omitted, 37 states; *p* Thousands of barrels, 42 gallons each; *q* 580 establishments, Bureau of the Census; *r* Classified sales, 580 establishments, Bureau of the Census; *s* 53 manufacturers, Bureau of the Census, in millions of lbs.; *t* 387 identical manufacturers, Bureau of the Census, quantity expressed in dozen pairs; *v* In thousands of bbls., Bureau of the Census; ** Indices, Survey of Current Business, U. S. Dept. of Commerce; *z* Units are millions of lbs.; ‡ 000 omitted; * New series beginning March, 1940.

Freeport Sulphur Earns $3.05

Net income of the Freeport Sulphur Company for the year 1942 amounted to $2,436,655 after all charges, including depreciation, depletion, special reserves and reserves for taxes, or $3.05 a share on the 800,000 shares of common stock, according to the company's preliminary report submitted to directors today by Langbourne M. Williams, Jr., president.

These earnings compare with $3,149,030, or $3.95 a share, for 1941.

Of the Freeport earnings $443,877, or 56 cents a share, represented the company's portion of the earnings of its subsidiary, Cuban-American Manganese Corporation, compared with $657,862, or 82 cents a share as its portion in 1941.

As of December 31, 1942, current assets amounted to $19,038,172, of which $8,296,537 was cash and government bonds, and current liabilities amounted to $3,463,905. As of December 31, 1941, current assets amounted to $17,604,492, of which $5,789,501 was cash and government bonds, and current liabilities amounted to $3,575,606.

Dow Pay $3.62 Share

The consolidated net income of The Dow Chemical Company and subsidiaries for the six months ended November 30, 1942, was $4,527,107.92 which, after providing for dividends on the outstanding preferred stock, was equivalent to $3.62 per share on the common stock outstanding. The net income was arrived at after providing for the six months' charge for amortization of completed facilities covered by certificates of necessity and for Federal normal income taxes, surtaxes, and excess profits taxes at an effective rate of tax computed upon the basis of estimated taxable income for the Company's fiscal year ending May 31, 1943.

Included in income for the six months ended November 30, 1942, were dividends of $200,000 received from an associated company.

American Cyanamid Earns $3,288,023

American Cyanamid Co. and subsidiaries in a report for the nine months ended September 30, 1942, subject to annual audit and year-end adjustments, show a net profit of $3,288,023 after depreciation, depletion, research and process development expenses, interest, provision of $10,600,000 for federal and foreign income taxes and a $750,000 reserve for contingencies. The above net is equal after preferred dividend requirements, to $1.10 a share on the 2,618,364 shares of common stock.

This compares with an adjusted net profit of $4,585,856, equal to $1.63 a share on common for the first nine months of 1941, when federal and foreign taxes on income amounted to $7,871,709 and contingent reserve was $750,000.

The net profit as above does not include the equity in the undistributed net profit of associated companies (50% owned or less).

Provision for federal taxes is based on the Revenue Act of 1942, the report states.

Dividends and Dates

Name	Per Share	Stock Record	Payable
American Viscose Corp. common	$ .50	1-18	2-1
Atlantic Refining Co., 4% pfd. A (quar.)	1.00	1-5	2-1
Atlas Powder Co., 5% conv. pfd. (quar)	1.25	1-20	2-1
Celotex Corp. com. (quar.)	.125	1-28	2-6
5% pfd. (quar.)	1.25	1-28	2-6
Colgate-Palmolive-Peet com. (quar.)	.125	1-26	2-15
$4.25 pfd. (quar.)	1.06¼	3-12	3-31
Consolidated Chemical Industries, Inc., $1.50 partic. pfd. class A (quar.)	.375	1-4	2-2
Class B (quar.)	.375	1-4	2-2
Du Pont (E. I.) de Nemours $4½ pfd. (quar.)	1.125	1-8	1-25
Hooker Electrochemical (quar.)	.40	2-13	2-27
Interchemical Corp., com.	.40	1-21	2-1
6% pfd. (quar.)	1.50	1-21	2-1
National Chemical and Mfg. (reduced)	.10	1-11	2-2
National Lead Co., 6% pfd. B (quar.)	1.50	1-15	2-1
Parke Davis & Co.	.30	1-14	1-30
Procter & Gamble Co. (quar.)	.50	1-25	2-15
Squibb (E. R.) & Sons $5 pfd. series A (quar.)	1.25	1-15	2-1
Standard Silica Corp. (irregular)	.15	2-5	2-15
Westvaco Chlorine, $4½ pfd. (quar.)	1.125	1-11	2-1

Earnings Statements Summarized

Company:	Net income 1942	Net income 1941	Common share earnings 1942	Common share earnings 1941
Atlas Powder Co.—Year, Dec. 31	$ 1,855,669	$ 1,904,601	$ 5.89	$ 6.13
Armour & Co. of Illinois & subs.—Year, Oct. 31	14,802,607	15,111,410	†20.85	†21.30
Bristol-Myers Co.—Dec.31 quarter	645,748	615,705	.97	.92
Bristol-Myers Co.—Year, Dec. 31	2,464,338	2,377,860	3.69	3.56
Cuban-American Manganese Corp. ¶Year, Dec. 31	494,100	732,297	.52	.77
Dominion Bridge Co., Ltd.—Year, Oct. 31	1,023,300	972,965	1.99	1.89
Dow Chemical Co.—Six months, Nov. 30	4,677,108	4,052,370	3.62	3.12
Hooker Electrochemical Co.—Year, Nov. 30	1,442,390	1,182,511	4.13	3.35
Johns-Manville Corp.—Year, Dec. 31	5,570,192	5,967,145	6.35	6.66
Masonite Corp.—Nov. 30 quarter	346,584	.....	.57	.....
McKesson & Robbins, Inc.—Six months, Dec. 31	2,172,099	3,957,544	1.20	2.27
Sylvania Industrial Corp.—Year, Dec. 31	998,211	1,150,650	2.41	2.75
United Gas Corp. & subs.—Nov. 30 quarter	1,997,218	1,348,051	r4.44	r2.99
United Gas Corp. & subs.—Year, Nov. 30	8,467,237	6,146,081	r18.82	r13.66

a On Class A shares; *b* On Class B shares; *c* On Combined Class A and Class B shares; *d* Deficit. *f* No common dividend; *j* On average number of shares; *k* For the year 1940; *b* On Preferred stock; On Class A shares. *y* Amount paid or payable in 12 months to and including the payable date of the most recent dividend announcement; ‡ Indicated quarterly earnings as shown by comparison of company's reports for the 6 and 9 months periods; § Plus extras; *n* Preliminary statement; *h* On shares outstanding at close of respective periods; ** Indicated quarterly earning as shown by comparison of company's reports for 1st quarter of fiscal year and the six months period; ‡‡ Indicated earnings as compiled from quarterly reports; † Net loss; * Not available; ¶¶ Before interest on income notes; *x* Paid on or declared in last 12 months plus extra stock; *w* Last dividend declared, period not announced by company.

Newport Nets $83,169

Newport Industries, Inc. in a report for the quarter ended September 30, 1942, subject to audit, shows a net profit of $83,169 after depreciation, amortization, interest and provision of $147,850 for federal income and excess profits taxes. Above net is equal to 13 cents a share on 621,359 shares of capital stock.

The provision for federal taxes, the report states, is based on a rate of 64%. This rate is approximate and is figured on the company's interpretation of the new tax law recently enacted.

For the quarter ended September 30, 1941 company reported a credit of $265,522 after charges and federal income taxes, but before provision for excess profits taxes. Net profit for the quarter ended June 30, 1942 was $104,457 after charges and all taxes, equal to 17 cents a share.

Price Trend of Representative Chemical Company Stocks

	Jan. 2	Jan. 9	Jan. 16	Jan. 23	Net gain or loss last mo.	Price on Jan. 24, 1942	1943 High	1943 Low
Air Reduction Co.	39⅝	38¾	41⅛	41½	+ 1⅞	35¾	42	38¾
Allied Chemical & Dye Corp.	145	140½	145¾	150	+ 5	137½	152½	140½
Amer. Agric. Chem.	23	23¼	24⅞	25¼	+ 2¼	22	25⅞	23
Amer. Cyanamid "B"	39⅞	38¼	38½	39¾	— ⅛	37¼	40¼	37¾
Columbian Carbon	85	82	82	82	— 3	71	85	79½
Commercial Solvents	9½	9⅞	10⅝	10¾	+ 1¼	9½	11⅜	9½
Dow Chemical Co.	134¼	131¾	133½	135	+ ¾	115	136	130½
du Pont	136⅝	134⅜	136½	138⅞	+ 2½	126⅝	143½	134
Hercules Powder Co.	74¾	75	75	75¼	+ ½	70¾	77¾	73
Mathieson Alkali Works	21¾	22⅝	23¼	24½	+ 2¾	29¼	24½	21¾
Monsanto	87	87	88	88½	+ 1½	84	88⅞	86¼
Standard Oil of N. J.	46⅞	47¼	47¼	47¾	+ ⅞	41⅝	48⅞	46½
Texas Gulf Sulphur	37¼	37⅛	37½	37½	+ ¼	34¼	38	36½
Union Carbide & Carbon	81¾	80	79⅞	80⅝	— 1⅛	68	82¾	79
United Carbon Co.	58	58	55½	56¾	— 1¼	42½	58¾	55½
U. S. Industrial Alcohol	30¾	30⅛	31	32¾	+ 2	31½	32¾	30

Chemical Finances

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Chemical Stocks and Bonds

January 1943 Last	1942 High	1942 Low	1941 High	1941 Low	1940 High	1940 Low	Stocks	Par $	Shares Listed	Dividends 1942	Earnings** $-per-share- 1941	Earnings** $-per-share- 1940	Earnings** $-per-share- 1939
NEW YORK STOCK EXCHANGE													
55¼	51½	37	55⅝	46	70¼	46¼	Abbott Labs.	No	755,204	1.60*	2.99	2.89	2.61
41	41⅝	29½	45	34⅝	52⅝	36½	Air Reduction	No	2,736,855	1.00*	2.62	2.38	1.96
151¼	149	118½	167½	135	183	135½	Allied Chem. & Dye	No	2,401,288	6.00*	9.67	9.43	9.50
25⅝	24	18¾	22⅞	14⅝	21	12¼	Amer. Agric. Chem.	No	627,981	1.20*	1.79	1.45	1.22
35¼	36	27⅜	35	26	35½	23	Archer-Dan.-Midland	No	545,416	2.00	5.69	5.42	3.03
58	43	70	72¼	61	80⅝	57	Atlas Powder Co.	No	254,827	3.50	6.13	5.71	3.82
113¼	111	116	121	111	124⅝	113½	5% conv. cum. pfd.	100	68,597	5.00	27.77	26.01	18.94
29	29⅝	15	30¾	18½	35½	20	Celanese Corp. Amer.	No	1,276,551	2.00	3.43	3.90	3.53
120½	120⅝	110	122¼	116¾	121	105½	prior pfd.	100	164,818	7.00	35.08	38.69	38.67
17¾	17⅝	11½	16¼	10⅞	20	10¼	Colgate-Palm.-Peet	No	1,962,087	0.50*	2.09	1.62	2.74
86	51	84¾	83	64	99¾	71	Columbian Carbon	No	537,406	4.25	6.57	5.71	5.32
11¼	10¼	7¼	11⅞	7½	10⅝	8	Commercial Solvents	No	2,636,878	0.60	.99	.91	.61
55½	58	42¼	55⅝	43¼	65¼	40¼	Corn Products	25	2,530,000	2.60	3.37	3.10	3.33
178	159	179	182½	164	184	165	7% cum. pfd.	100	245,738	7.00	41.78	7.23	7.70
20½	14	21	21	13¾	23¾	13½	Devoe & Rayn. A.	No	95,000	1.00	7.08	1.14	2.08
135⅝	95	134½	141⅝	111¼	171	127¼	Dow Chemical	No	1,135,187	3.00	6.58	6.65	3.76
143½	102⅜	144	164⅝	125¾	189¼	146½	DuPont de Nemours	20	11,065,762	4.25	7.50	7.23	7.70
126⅜	120	127	127	120⅞	120⅝	114	4½% pfd.	No	1,688,850	4.50	53.53	51.48	52.25
156	151½	108	145½	120¾	166⅝	117	Eastman Kodak	No	2,488,242	5.00	8.57	7.96	8.55
178	170	180	183½	160	180	155	6% cum.	100	61,657	6.00	350.14	325.62	337.65
37⅜	38¾	27	41	33½	36¾	24¾	Freeport Sulphur	10	796,380	2.00	3.95	3.81	2.76
5½	5⅝	3⅝	7½	4⅝	10	5½	Gen. Printing Ink	1	735,960	0.30	1.00	.86	.94
16	16	12⅛	17⅞	11	19⅝	11	Glidden Co.	No	829,989	1.10	3.08	1.56	1.70
43	37⅜	44	46	25	45	30	4½% cum. pfd.	50	199,940	2.25	15.06	8.64	9.27
99	94½	79¼	98	76	113¾	86⅞	Hazel Atlas	25	434,409	5.00	6.63	5.98	6.60
77½	75¼	51	80¼	65¼	100⅜	69	Hercules Powder	No	1,316,710	2.50	4.23	4.01	3.65
132	134	125	132½	123½	133⅝	126¼	6% cum. pfd.	100	96,194	6.00	69.71	66.38	60.57
34½	35	21	29⅞	20¾	29	16⅝	Industrial Rayon	No	759,325	2.00*	3.04	3.51	1.77
22¼	18½	23½	27	19	47⅝	21¼	Interchem.	No	290,320	1.60	6.01	2.47	4.10
106⅝	100⅜	111½	115¾	107	113	91	6% pfd.	100	65,661	6.00	32.79	16.99	24.27
15¼	12¼	3½	..	..	..	..	Intern. Min. & Ch.	5	473,981	0.50	...	...	...
60	57	38	..	..	..	..	4% cum. pfd.	100	100,000	4.00	...	...	...
34⅝	30⅞	24¼	31⅝	23	35⅞	19⅝	Intern. Nickel	No	14,584,025	2.00	2.23	2.30	2.39
40½	39	48¼	49	38¼	39⅝	36⅞	Intern. Salt	No	240,000	2.00	3.76	3.98	1.92
23½	24	17½	23	17¼	29⅝	14⅝	Kellogg (Spencer)	No	509,213	1.90	3.66	2.74	1.80
33⅞	33¾	20½	45⅝	19¼	39⅝	30	Libbey Owens Ford	No	2,513,258	1.00	3.52	3.97	3.21
16½	16½	11⅝	16⅝	13	19⅝	10½	Liquid Carbonic	No	723,100	1.00*	2.92	2.21	1.62
23⅝	29½	19½	31¾	24¼	32⅝	21	Mathieson Alkali	No	823,171	1.00	1.90	1.72	1.13
88	91	66	94	77	110	79	Monsanto Chem.	No	1,241,816	2.25	4.90	4.33	4.01
115	110	117½	118½	112	119	110	4½% pfd. A.	No	50,000	4.50	38.43	57.38	54.29
118	112	120	123	115	128	113½	4½% pfd. B.	No	50,000	4.50	38.43	57.38	54.29
110½	110¾	102½	113½	106⅞	...	...	4 % pfd. C.	No	50,000	4.00	38.43	...	...
15⅛	16¼	11⅞	19¼	12¼	29⅝	14⅛	National Lead	10	3,090,664	0.50	1.10	1.34	1.23
160	145	168	170	160½	170	160	7% cum. "A" pfd.	100	213,793	7.00	24.68	28.54	27.04
142½	129	146	154	138	159⅝	132	6% cum. "B" pfd.	100	103,277	6.00	49.99	59.46	55.30
33½	29½	36	36	26	44	25⅝	National Oil Products	4	179,829	1.00	4.11	3.92	3.89
12¼	11⅜	7¼	11⅞	5⅝	14⅜	6¼	Newport Industries	1	621,359	0.50	1.14	0.50	0.66
57⅛	57⅜	43¼	54	38⅝	64⅝	43	Owens-Illinois Glass	12.50	2,661,204	2.00	3.40	2.71	3.17
50⅜	52⅜	42	61⅜	47½	71⅝	53	Procter & Gamble	No	6,409,418	2.00	4.20	4.37	3.80
120¼	115	122	120	115	118½	113¾	5% pfd.	100	169,517	5.00	324.38	336.78	298.55
19⅜	18¾	10¼	16¾	10¼	13¾	7⅝	Shell Union Oil	No	13,070,625	1.00	1.33	1.05	0.77
32⅛	30¼	19⅜	35¼	18⅞	23¼	12¾	Skelly Oil	No	981,349	1.25	6.03	3.28	1.99
29	29	20	34¼	24⅞	30	20¾	S. O. Indiana	25	15,272,020	1.00*	3.17	2.20	2.24
49	47	30½	46⅞	33	46½	29¼	S. O. New Jersey	25	27,278,666	1.00*	5.15	4.54	3.27
10	9⅜	7½	9⅝	6	9¼	4¼	Tenn. Corp.	5	853,696	1.00	1 60	1.36	0.41
43⅞	42¼	30	46⅝	34½	47⅝	33	Texas Corp.	25	10,876,882	2.00	4.77	2.90	3.02
38¼	37½	28	38⅞	30¼	37¼	26⅝	Texas Gulf Sulphur	No	3,840,000	2.00*	2.35	2.38	2.04
80⅝	83	58	79⅞	60	89⅝	59⅞	Union Carbide & Carbon	No	9,277,288	3.00	4.53	4.55	3.88
56½	58½	37	59	35	65⅝	42½	United Carbon	No	397,885	3.00	4.30	3.36	3.81
32	24½	34¼	34¼	20	28	14	U. S. Indus. Alcohol	No	391,238	1.00*	...	2.73	1.06
17¾	20⅞	14¼	34¼	15¼	45⅞	25	Vanadium Corp. Amer.	No	405,706	0.25	3.03	2.85	3.25
24½	18¾	25½	27¼	20	31⅝	14	Victor Chem.	5	750,000	1.10	1.59	1.57	1.59
3⅝	2⅞	1	3½	⅝	4¼	1⅝	Virginia-Caro. Chem.	No	486,122	...	—1.89	—1.36	—1.57
45¼	40¼	22½	29½	18⅞	31⅝	14	6% cum. part. pfd.	100	213,052	5.00	1.69	2.89	2.41
27½	22	31½	36½	27¼	35½	27⅝	Westvaco Chlorine	No	553,132	1.40	2.92	2.96	2.91
107¼	100½	108⅝	112	105	106⅞	106	cum. pfd.	No	58,415	4.50	22.19	21.98	...
NEW YORK STOCK EXCHANGE													
40⅛	41⅞	28⅝	42⅝	31	39⅞	26	Amer. Cyanamid "B"	10	2,618,387	0.60*	2.42	2.44	2.07
9	6⅞	9	7⅝	6⅜	8¼	5	Duval Texas Sulphur	No	500,000	2.00	1.42	1.16	1.25
85	88½	65	99	65	92	60	Heyden Chem. Corp.	100	104,983	3.00	9 04	7.86	5.98
89	86½	55¼	96¼	55	104	65	Pittsburgh Plate Glass	25	2,188,040	3.50	6.82	6.30	4.94
88	59⅝	84½	84	61	100	62½	Sherwin Williams	25	638,927	3.00	7.83	6.57	5.96
114½	110	115	115½	108½	114¾	106	5% cum. pfd.	50	122,289	5.00	47.82	39.49	35.08
PHILADELPHIA STOCK EXCHANGE													
150	175½	125	185	162	192	158¾	Pennsylvania Salt	50	180,000	6.75	10.99	11.51	8.63

January 1943 Last	1942 High	1942 Low	1941 High	1941 Low	1940 High	1940 Low	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE											
104¼	104⅝	101⅝	104½	100⅝	105⅛	100⅛	Amer. I. G. Chem. Conv.	1949	5½	M-N	$22,400,000
60⅛	34	55⅝	43¾	26½	41	27½	Anglo Chilean Nitrate ins. deb.	1967	4½	J	10,400,000
60	35	57	40	25⅜	39⅝	27	Lautaro Nitrate ins. deb.	1975	4	J-D	27,200,000
99	98½	95⅝	99⅞	94⅝	100⅛	93½	Shell Union Oil	1954	2½	J-J	55,000,000
105⅝	105½	103	106⅝	102½	107	101½	Standard Oil Co. (New Jersey) deb.	1961	3	J-D	85,000,000
104⅝	103⅜	105⅝	150⅝	103	107	100⅝	Standard Oil Co. (New Jersey) deb.	1953	2¾	J-J	50,000,000
105½	104½	106¼	107⅝	102⅞	108⅛	103	Texas Corp.	1959	3	A-O	40,000,000

* Also extra or extras.

** For either fiscal or calendar year.

x New stock.

New Trade Marks of the Month

TURF TONIC
339,549

Soap-Eater
452,195

PRELOAD
454,041

TIRE SEAL
455,146

FLEX-O-GLASS
437,229

GLASCO
452,232

V
454,046

BACTRAZINE
455,463

CECO
447,871

DOUBLE MIX
452,623

BOTTLED GLOVES
455,586

"Securely yours"
RUBBERTEX
448,573

SAXE-RUSHWORTH CO. INC.
GAMBINE TANNING EXTRACT
NEW YORK, N.Y.
453,586

TELCOVIN
454,125

PHANTOM GLOVES
455,588

PHILCO
450,903

SEKO
454,149

DAR-KOL
455,593

PHILCO
450,941

Cole-Mor-Ite
453,701

OXI CRYSTALS
455,877

Carbonox
453,820

MAR-KEM
452,077

THERMOLAST
453,935

Cataract
SUPER BOND
454,300

VANSEAL
455,951

Trade Mark Descriptions†

399,549. Edgewood Farms, Inc., Marysville, Ohio; Sept. 17, 1941; for fertilizer; since Mar. 1, 1941.

437,229. Flex-O-Glass Manufacturing Co. and Warp Brothers, Chicago, Ill.; Oct. 23, 1940; for flexible, translucent, and transparent materials used as substitutes for glass; since July 1, 1922.

447,871. The City Engineering Co., Dayton, Ohio; Oct. 17, 1941; for instruments for recording and controlling temperature, pressure and vacuum; since May 22, 1941.

448,573. Morenci Allied Products, Morenci, Mich.; Nov. 12, 1941; for adhesive cement used for cementing rubber to cloth, glass, metal, rubber and wood; since June 5, 1941.

450,903. Philco Corp., Philadelphia, Pa.; Feb. 11, 1942; for caulking cement and rubber cement; since 1924 on caulking cement; and since 1936 on rubber cement.

450,941. Philco Corporation, Philadelphia, Pa.; Feb. 13, 1942; for sulfuric acid, electrolyte, and jar finishing solution; sulfuric acid since 1926; electrolyte since September 1922, jar finishing solution on rubber battery containers since Feb. 2, 1942.

452,077. Maritime Chemical & Repair Corp., Brooklyn, N. Y.; Apr. 1, 1942; for chemical solvent compounds used in servicing power equipment;, since June 9, 1941.

452,195. Soap-Eater Co. of America, Albuquerque, N. Mex.; Apr. 7, 1942; for washing powder; since July 1, 1941.

452,232. Glasco Products Co., Chicago, Ill.; April 3, 1942; for chemical, scientific, and laboratory glassware; since Dec. 9, 1929.

452,623. Double Mix Co., Kansas City, Mo.; Apr. 27, 1942; for composition comprising salt, bi-carbonate of soda, rennin and coloring in tablet; since Apr. 17, 1942.

453,586. Saxe-Rushworth Co., Inc., New York, N. Y.; June 10, 1942; for extract used in tanning leather; since May 18, 1942.

453,701. The Vulcanized Rubber Co., New York, N. Y.; June 16, 1942; for molded compound in the nature of a thermo-setting plastic material; since May 12, 1942.

453,820. American Firstoline Corporation, New York, N. Y.; June 23, 1942; for zinc pigments; since Sept. 1, 1941.

453,935. Elematic Corporation, Blue Island, Ill.; June 29, 1942; for pyrometer attachments — namely, thermocouple protecting tubes; since June 6, 1942.

454,041. The Preload Co., Boston, Mass.; July 3, 1942; for receptacles of cement or concrete—namely, tanks for water, oil, or gasoline; since Apr. 10, 1942.

454,046. The Waterbury Button Company, Waterbury, Conn.; July 3, 1942; for plastic collapsible tube containers; since June 5, 1942.

454,125. The Telegraph Construction & Maintenance Co., Ltd., London, England; July 9, 1942; for gutta percha, india-rubber, balata, and synthetic rubber; since December, 1941.

454,149. Seederer-Kohlbusch, Inc., Jersey City, N. J.; July 10, 1942; for precision balances; since Oct. 8, 1930.

454,300. Cataract Chemical Co., Inc.; Buffalo, N. Y.; July 18, 1942; for adhesive cement and adhesive cement thinner for shoes; since July, 1940.

455,146. Tire Seal Co., Los Angeles, Calif.; Aug. 27, 1942; for tire-puncture-proofing compounds; since 1923.

455,463. Wallace Laboratories, New Brunswick, N. J.; Sept. 10, 1942; for pharmaceutical ointment with antiseptic properties; since July 23, 1942.

455,586. Irene Blake Cosmetics, Inc., New York, N. Y.; Sept. 17, 1942; for hand cleanser; since Aug. 4, 1942.

455,588. Irene Blake Cosmetics, Inc., New York, N. Y.; Sept. 17, 1942; for hand cleanser; since Aug. 4, 1942.

455,593. Richard E. Houser, Houston, Tex.; Sept. 17, 1942; for oils, having rust, corrosion and gum dissolving properties, cleaning properties; since Apr. 15, 1942.

455,877. Walters "Oxi" Corporation, Gary, Ind.; Sept. 30, 1942; for crystals used for removing soot, carbon scale, slag; since July, 1930.

455,951. Mid-West Shoe Supplies Company, St. Louis, Mo.; Oct. 3, 1942; for cement for adhering shoe parts together; since Feb. 26, 1942.

455,988. Schreiber Milling & Grain Co., St. Joseph, Mo.; Oct. 5, 1942; for feed supplement for cattle, hogs, and chickens, containing vitamins, proteins; since July 14, 1942.

456,173. S. Blickman, Inc., Weehauken, N. J.; Oct. 14, 1942; for plastic composition

† Trademarks reproduced and described include those appearing in the *Official Gazette of the U. S. Patent Office* Jan. 5 to Jan. 26, 1942.

New Trade Marks of the Month

VITROL
455,988

ROYCELITE
456,511

LUXIFLUX
456,696

Alferon
456,790

Brightboy FINE-TEX
456,548

SPEKSOLDER
456,701

CORRESITE
456,173

TRINIDEX
456,819

Brightboy TUFF-TEX
456,549

KOLOC
456,702

CELATOP
456,233

AVENARIUS
456,843

TARTEX
456,608

KOLOC
456,703

KELCO-TITE
456,241

THICHLORON
457,076

TOPTOX
456,269

PANAGEN
456,660

"CHEXCHEX"
456,708

NEOVIS
457,077

ISOTEMP
456,334

456,676

SULFASUXIDINA
457,158

WOOLSEY'S
456,354

SUVENEER
456,734

UBATEX
456,678

ZERO
456,486

LAWNEW
456,683

CYCLE-WELD
456,765

457,174

Trade Mark Descriptions (*Cont'd.*)

manufactured in sheet, rod or tube form; since Sept. 10, 1942.

456,233. Celanese Corporation of America, New York, N. Y.; Oct. 16, 1942; for collection of staple fibers made wholly or partially of cellulose derivatives; since Oct. 12, 1942.

456,241. The M. W. Kellogg Company, Jersey City, N. J., and New York, N. Y.; Oct. 16, 1942; for waterproof, fire-proof and acid and alkali resistant paints; since May 31, 1939.

456,269. Hitox Products, New York, N. Y.; Oct. 19, 1942; for insecticides; since Sept. 5, 1942.

456,334. Fisher Scientific Company, Pittsburgh, Pa.; Oct. 22, 1942; for electrically-operated Laboratory oven; since Feb. 15, 1942.

456,354. C. A. Woolsey Paint & Color Co., Inc., New York, N. Y.; Oct. 22, 1942; for ready mixed paints, enamels, varnishes, stains, lacquers; since June, 1891.

456,486. Beacon Chemical Corporation, Philadelphia, Pa.; Oct. 28, 1942; for cleanser for wood, metals, glass, leathers, fabrics; since Oct. 17, 1942.

456,511. Royce Chemical Co., Carlton Hill, N. J.; Oct. 29, 1942; for synthetic resin suitable for warp sizing and as a sizing agent on cotton fabrics, worsted yarns, and carpets; since July 30, 1942.

456,548. Weldon Roberts Rubber Co., Newark, N. J.; Oct. 30, 1942; for abrasive impregnated rubber compound adapted for metal polishing and cleaning operations; since June 6, 1942.

456,549. Weldon Roberts Rubber Co., Newark, N. J.; Oct. 30, 1942; for abrasive impregnated rubber compound adapted for metal polishing and cleaning operations; since Oct. 9, 1942.

456,608. Louis Dondon, New York, N. Y.; Nov. 2, 1942; for fruit acid substitute; since Oct. 27, 1941.

456,660. Premo Pharmaceutical Laboratories, Inc., New York, N. Y.; Nov. 5, 1942; for pharmaceutical preparation of vitamins; since July 15, 1942.

456,676. Tin-kote Laboratories, Revere, Mass.; Nov. 6, 1942; for tinning and soldering compound; since April, 1935.

456,678. Union-Baystate Co., Inc., Cambridge, Mass.; Nov. 6, 1942; for adhesive cement; since July 1, 1942.

456,683. Victor Dewein, Emery and Forsyth, Ill.; Nov. 7, 1942; for lawn, plant, and shrub foods; since Oct. 22, 1942.

456,696. Special Chemicals Corp., New York, N. Y.; Nov. 7, 1942; for mixture of chemicals introduced into the gas flow of the heating flame in soldering, welding, and brazing operations to impart non-oxidizing qualities; since October, 1939.

456,701. Special Chemicals Corp., New York, N. Y.; Nov. 7, 1942; for mixture of chemicals used for soldering, welding, and brazing; since March, 1937.

456,702. United States Rubber Company, New York, N. Y.; Nov. 7, 1942; for reclaimed rubber compositions used in depositing minute rubber particles in fabrics; since May 26, 1942.

456,703. United States Rubber Co., New York, N. Y.; Nov. 7, 1942; for latex compositions used in depositing individual minute rubber particles in fabrics; since May 29, 1942.

456,708. The Akron Paint & Varnish Company, Akron, Ohio; Nov. 9, 1942; for rubber preservative paint; since Oct. 7, 1942.

456,734. Superior Steel Corporation, Carnegie and Pittsburgh, Pa.; Nov. 10, 1942; for metal strip or sheet material; since Nov. 2, 1942.

456,765. Chrysler Corporation, Highland Park, Mich.; Nov. 12, 1942; for adhesive cement; since May 19, 1942.

456,790. Driver-Harris Company, Harrison, N. J.; Nov. 13, 1942; for chrome-iron-aluminum alloys in various forms; since Oct. 19, 1942.

456,819. Baxter Laboratories, Inc., Glenview, Ill.; Nov. 14, 1942; for solutions containing vitamins; since Oct. 27, 1942.

456,843. Carbolineum Wood Preserving Co., Milwaukee, Wis.; Nov. 16, 1942; for liquid wood preservative used as a fungicide and an insecticide; since Jan. 6, 1888.

457,076. The Chicago Pharmacal Company, Chicago, Ill.; Nov. 27, 1942; for hematinic tonic containing iron sulfate and thiamine chloride; since Nov. 4, 1942.

457,077. First Texas Chemical Manufacturing Co., Dallas, Tex.; Nov. 27, 1942; for vitamin preparation; since Oct. 12, 1942.

457,158. Sharp & Dohme, Incorporated, Philadelphia, Pa.; Dec. 1, 1942; for pharmaceutical preparations; since Nov. 18, 1942.

457,174. The Velvetta Mfg. Co., Philadelphia, Pa.; Dec. 2, 1942; for insecticide; since 1903.

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CHEMICAL INDUSTRIES

Statistical and Technical Data Section

No. 2 Part 2

War Regulations

Priorities, Allocations, Import and Price Controls—p. 43

Summary of War Regulations

There are no more important subjects to the chemical industry today than priorities, allocations, import and price controls. Chemical Industries, last month, chronologically digested the important regulations up to December 31, 1942. This month new regulations are brought up to January 31, 1943. Next month and each month thereafter additional and revised regulations will be given.

By way of explanation a "P" order identifies a limited blanket rating given to a company, or an industry to facilitate the acquisition of scarce materials needed by such companies for defense or essential civilian production.

Distribution of commodities under industry-wide control generally is governed by "M" (material) orders, regulating distribution and flow of a given material into defense or essential civilian production channels.

Limits on the production of materials are covered by "L" limitation orders.

Acrylic Resins

Jan. 21, 1943. January allocation of acrylic resins for dentures corrected as follows: "Acrylic resins for dentures were granted in part. Health Supplies Div. determined adequate amount for essential civilian dentures. This quantity allocated in full."

Acrylonitrile

Jan. 9, 1943. Allocation control over acrylonitrile has been established by amendment to Order M-153.

Aluminum Ingot

Jan. 6, 1943. Maximum base price of 15 cents/lb. for all secondary aluminum ingot with certain specific exceptions was established by OPA through amendment of its price schedule covering aluminum scrap and secondary ingot.

The change provides that, where specifications for ingot require substantial additions of certain costly ingredients in the secondary smelting process, there may be maximum prices above 15 cents. However, these must be reported to and approved by OPA.

Specific dollars and cents maximums are set for low-grade ingot.

Annato

Jan. 1, 1943. Use of annato or annato extracts restricted to coloring food products, by conservation Order M-103, as amended by Director General for Operations.

Civilian quotas for all anthraquinone dyes for the first quarter of 1943 will remain at 70 per cent of 1941 consumption. Export quotas for such dyes for the first quarter will remain at 8 per cent of each manufacturer's monthly production.

Anti-freeze Solutions

Jan. 20, 1943. Manufacture of anti-freeze solutions compounded with inorganic salts or petroleum distillates prohibited by Limitation Order L-258. Solutions compounded with such salts, including calcium chloride, magnesium chloride, or sodium chloride, as well as petroleum distillates, are deleterious to cooling systems and motors.

Butadiene

Jan. 9, 1943. Allocation control for butadiene established by amendment to Order M-178.

Calcium Base Solutions

Jan. 20, 1943. OPA, in Amendment No. 2 to Maximum Price Regulation No. 170, fixed retail price of calcium base solutions at 75c/gal. This compares with $2.65 price generally charged the public for these products.

Carbon Tetrachloride

Jan. 9, 1943. Use of B-2 rating to be assigned to 100% of base period use of carbon tetrachloride has been extended by amendment to Order M-41.

Cellulosic Transparent Materials

Jan. 4, 1943. Use of cellophane and similar transparent materials from cellulose prohibited, with exceptions, in packaging of 27 specified types of articles by amendment to Order L-20.

Chromium Chemicals

Jan. 7, 1943. Inventories of chromium chemicals are restricted by amendment to Order M-18-b which also permits issuance of delivery and use restrictions.

Coated and Bonded Abrasive Products

Feb. 8, 1943. Maximum Price Regulation No. 316—Coated and Bonded Abrasive Products replaces General Maximum Price Regulation for these products and is effective February 12.

Coated abrasive products include sandpaper and abrasive coated cloths. Bonded abrasive products include grinding wheels, segments, sticks, sharpening stones, and other abrasive bonded products, including diamond bonded abrasive products.

Drugs

Jan. 9, 1943. Purchase, sale, use, transfer, delivery of quinine, totaquine, cinchona bark have been restricted by amendment to Order M-131.

Ethyl Alcohol

Jan. 7, 1943. Delivery, use, and small order exemption restrictions of ethyl alcohol have been altered by amendment to Order M-30 effective Jan. 1.

Ethyl Cellulose

Jan. 21, 1943. Ethyl cellulose allocated in full for food, transportation, communication and utilities, photography and x-ray, industrial uses, and printing and publishing, except where end use and substitutes did not warrant use of ethyl cellulose. Denied for civilian clothing, civilian furniture and civilian plastics.

Fats and Oils

Jan. 1, 1943. Filing of fats and oils reports for 4th quarter, 1942, are required by amendment to Order M-71 which also amends use percentage in Schedule A.

Fats and Oils

Jan. 7, 1943. Prohibited uses of fats and oils have been changed by amendment to Order M-71.

Fertilizers

Jan. 1, 1943. Amendment No. 1, Order M-231 for chemical fertilizers has been amended revoking paragraph (f) (1).

Magnesium Scrap and Ingot

Jan. 15, 1943. Specific dollars and cents maximum prices for magnesium scrap and remelt magnesium ingot established by Office of Price Administration in Maximum Price Regulation No. 302, effective Jan. 20. This supplemented recent WPB order requiring segregation of such scrap.

Methyl Alcohol

Jan. 7, 1943. Methyl alcohol, or methanol, placed under allocation effective

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January 15 by General Preference Order M-31 as amended.

Increased demand caused by requirements for formaldehyde to produce hexamethylene tetramine used in explosives, methanol used in manufacture of methyl methacrylate resins for military aircraft, and nexamethylene tetramine for Russia.

Oils

Jan. 14, 1943. Because of increasing shortage of oils, the paint industry should conserve drying oils for paint and experiment with substitutes, members of the Technical Subcommittee of the Protective and Technical Coatings Industry Advisory Committee urged. With the exception of oil for coatings for certain implements of war, only 70 per cent of the average amount of oils used by the paint industry in 1940 and 1941 is available now to manufacturers, and it is possible this amount may be lowered still further in the future.

Petroleum

Jan. 4, 1943. All orders in M-68 series for petroleum material conservation have been transferred to Petroleum Administrator for War.

Phenolic Resin Protective Coatings

Jan. 21, 1943. Phenolic resin protective coatings granted in full for medical, pharmaceutical, food, health supplies and printing and publishing (to the extent of conforming with M-53). Individual allocations adjusted for inventory and where excessive amounts requested.

Phenolic resin protective coatings denied for first aid, air raid defense, fire extinguishers, utilities and transportation, except use in armatures and coils which was granted in full. All other uses denied.

Platinum

Jan. 3, 1943. Interpretation No. 2 for Order M-162 on platinum redefines term "assemble."

Primary Chromium Chemicals

Jan. 7, 1943. Consumers of primary chromium are no longer required to file Form PD-54 with suppliers, but only with WPB under General Preference Order M-18-b as amended by Director General for Operations. This step has been taken to eliminate paper work. Users of less than 500 pounds of primary chromium chemicals a month will be exempt from filing Form PD-54.

Primary chromium chemicals are defined in the order as bichromate of soda, bichromate of potash, sodium chromate and all chromium tanning compounds.

Styrene

Jan. 9, 1943. Use of styrene subject to allocation control by amendment to Order M-170.

Thermoplastics

Jan. 9, 1943. Use of thermoplastics in manufacture of articles on Schedule A prohibited, subject to specified exceptions by amendment to Order M-154.

Tungsten

Jan. 9, 1943. Tungsten secondary chemicals, including pigments, are eliminated from Order M-29 by amendment.

Uranium and Compounds

Jan. 26, 1943. Delivery of uranium and its compounds for use in ceramics forbidden by Conservation Order M-285.

Order M-285 expressly forbids, after Jan. 26, sale and delivery, and purchase and receipt of uranium and its compounds for use in glass, pottery, tile, and other ceramic products.

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A Complete Check—List of Products, Chemicals, Process Industries

Petroleum*

Process for dewaxing mineral oils. No. 2,296,417. George Bays, Jr. and Joe Franklin, Jr. to Standard Oil Development Co.

Continuous process for reacting paraffins of low molecular weight with normally gaseous olefins to produce predominantly paraffinic oils in the motor fuel boiling range and of higher molecular weight. No. 2,296,511. Frederick Frey, Paul McKinney and William Wood to Phillips Petroleum Co.

Continuous process for reacting paraffins of low molecular weight with normally gaseous olefins to produce predminantly paraffinic oils in motor fuel boiling range and of higher molecular weight. No. 2,296,512. Frederick Frey, Paul McKinney and William Wood to Phillips Petroleum Co.

Process for breaking water-in-oil emulsions. No. 2,296,600. Melvin De Groote and Bernhard Keiser to Petrolite Corp., Ltd.

Method of thermally cracking heavy hydrocarbons to produce motor fuel and reforming light hydrocarbons. No. 2,296,601. William Dorsett to Petroleum Conversion Corp.

Method of catalytically cracking hydrocarbon oils to form lower boiling motor fuel products. No. 2,296,722. Joseph Marancik and Homer Martin to Standard Oil Development Co.

Separation of phenols and alkylated products thereof. 2,297,588. Donald Stevens and Clarence Lininstone to Gulf Research & Development Co.

Process for the catalytic isomerization of 1-olefins to produce 2-olefins. 2,298,931. Harry E. Drennan to Phillips Petroleum Co.

Process of homogeneously blending wax with linear high molecular weight hydrocarbon polymer susceptible to depolymerization and breakdown by heat and mechanical attrition. 2,298,846. Arthur Skooglund to Jasco, Inc.

Method for recovering hydrocarbons boilings within gasoline range from gas obtained from distillate wells under pressure. 2,298,818. Stuart Buckley to Standard Oil Development Co.

Method for producing gaseous oxide of solid metalloid of carbon and sulfur in a substantially pure state. 2,298,798. Warren Lewis and Thomas Moore to Standard Oil Development Co.

Production of non-reactive petroleum distillates of kerosene boiling range by treatment with fuming sulfuric acid. 2,298,753. Carl Cross and Edgar Grogg to Sinclair Refining Co.

Method of converting normally gaseous hydrocarbons to normally liquid products. 2,298,702. Percival Keith, Jr., to The Polymerization Process Corp.

Chlorinated esters of acids derived from petroleum. 2,298,670. Gellert Alleman and John Perring to Sun Oil Co.

Process for producing free sulfur and water as sole oxidation products from hydrogen sulfide contained in normally gaseous hydrocarbons. 2,298,641. Walter Schulz and James Owen to Phillips Petroleum Co.

Mineral oil composition. 2,298,557. Everett Fuller to Socony-Vacuum Oil Co.

Process of converting hydrocarbon oil into substantial yields of relatively high anti-knock gasoline. 2,298,434. Charles Thomas to Universal Oil Products Co.

Copper sweetening hydrocarbon oils. 2,298,411. Davis Reed, Jr., and Wayne Benedict to Universal Oil Products Co.

Process for producing saturated hydrocarbons of motor fuel boiling range and high antiknock value. 2,298,383. Vladimir Ipatieff and Herman Pines to Universal Oil Products Co.

Process for production of high octane motor fuel. 2,298,355. Gustav Egloff to Universal Oil Products Co.

Catalytic hydrogenation process for effecting substantial desulfurization of gasoline containing both olefinic hydrocarbons and sulfur carbons to an extent not materially reducing the anti-knock value of said gasoline. 2,298,347. Ben Corson and George Monroe to Universal Oil Products Co.

Catalytic hydrogenation process for effecting desulfurization of gasoline containing both olefinic hydrocarbons and sulfur compounds and hydrogenation of said olefinic hydrocarbons to extent not materially reducing the anti-knock value of said gasoline. 2,298,346. Ben Corson and George Monroe to Universal Oil Products Co.

Process for producing more valuable products from hydrocarbon mixture containing olefins and paraffins of 2, 3 and 4 carbon atoms to the molecule. 2,298,331. Charles Angell to Universal Oil Products Co.

Process for producing more valuable products from hydrocarbon mixture containing olefins and paraffins and paraffins of 2, 3 and 4 carbon atoms to the molecule. 2,298,330. Charles Angell to Universal Oil Products Co.

Manufacture of improved lubricating greases substantially free of occluded gases and vapors. 2,293,317. Herschel Smith to Gulf Oil Corp.

Apparatus for fractional distillation. 2,298,294. Everett Hughes to The Standard Oil Co.

Mineral oil gels. 2,298,066. Winton Patnode to General Electric Co.

Treatment of hydrocarbon oil. 2,297,866. Wayne Benedict to Universal Oil Products Co.

Extraction and treatment of volatile liquid hydrocarbons. 2,297,832. Edward Hudson to Cities Service Oil Co.

Hydrocarbon conversion. 2,297,775. Elmer Kanhofer to Universal Oil Products Co.

Hydrocarbon conversion. 2,297,774. Elmer Kanhofer to Universal Oil Products Co.

Hydrocarbon conversion. 2,297,773. Elmer Kanhofer to Universal Oil Products Co.

Sweetening hydrocarbon distillates. 2,297,751. Charles Dryer and Charles Wirth to Universal Oil Products Co.

Hydrocarbon reforming. 2,297,695. Gustav Egloff to Universal Oil Products.

Process for treating gaseous hydrocarbons. 2,297,675. Walter Dabhuff and Robert Fowman to Standard Oil Co. of California.

Process of inhibiting internal corrosion in a ferrous metal pipeline carrying gasoline. 2,297,666. Aaron Wachter to Shell Development Co.

Nonaqueous drilling fluid. 2,297,660. Willem Mazee to Shell Development Co.

Method of treating oils. 2,297,650. Walter Fry and Benjamin Hartman to Socony-Vacuum Oil Company, Inc.

Method for removing acidic substances from liquid hydrocarbons. 2,297,621. Lawrence Henderson and George Ayers, Jr., to The Pure Oil Co.

Hydrocarbon oil treating. 2,297,620. Lawrence Henderson and Arthur Schroder to The Pure Oil Co.

Conversion of hydrocarbon oils. 2,297,617. Arthur Goldsby to The Texas Company.

Petroleum refining. 2,297,537. Wallace Craig and Paul Rich to Richfield Oil Corp.

Gasoline containing a minor quantity of lead tetraethyl which normally tends to decompose in storage, and as a stabilizer therefor, a small quantity of an alkyl amine salt of an alkyl pyrophosphoric acid ester. 2,297,114. Ralph B. Thompson to Universal Oil Products Co.

Rectifying column control. 2,297,098. Samuel C. Carney to Phillips Petroleum Co.

Resins, Plastics*

Method of raising softening point of artificial threads spun from polyvinyl chloride. No. 2,295,660. Emil Hubert and Karl Rossler

High molecular weight plastic polymer of formaldehyde. No. 2,296,249. Paul Austin and Charles Frank to E. I. du Pont de Nemours & Co.

Cushioning material of spongelike or cellular rubber. 2,298,986. Stanley D. Taylor, Evelyn W. Madge and Edward A. Murphy to Dunlop Rubber Co., Ltd.

Plastic and coating compositions from fatty oils, fatty acids, esters of fatty acids. 2,298,916. Laszlo Auer.

Plastic and coating compositions from fatty oils, fatty acids, esters or fatty acids. 2,298,914. Laszlo Auer.

Resinous composition. 2,298,866. Robert Burnett to General Electric Co.

Processing of high molecular weight plastic iso-olefin in polymers. 2,298,813. Luther Turner to Jasco, Inc.

Resinous fusion product. 2,298,470. Arnold Davis to American Cyanamid Co.

Stable water-dispensible hydrated casein-straight chain alkyl amine higher fatty acid soap resin. 2,298,269. Francis Atwood to Atlantic Research Associates, Inc.

Plastic masses similar to factice and linoxyn. 2,298,078. Werner Wolff to General Aniline & Film Corp.

Process for plasticizing lignocellulosic materials. 2,298,017. William Loughborough.

Method of producing alkyd resins. 2,297,716. Ralph Potts and John McKee to Armour and Company.

Process of and apparatus for extruding plastic sheets. 2,297,645. James Bailey to Plax Corp.

Melted plastic stereotype mat consisting essentially of an intimate mixture of cellulose fibers and thermoplastic lignin, and containing approximately 10% to 20% of water, based on the weight of said stereotype mat. 2,297,635 Arlie Schorger to Burgess Cellulose Co.

Method and apparatus for molding plastic material. 2,297,504. Pino Salvaneschi.

Method dissolving hard and difficultly soluble fossil resins, especially copal resins. 2,297,083. Oskar Evensson.

Method making closed cell rubber. 2,297,002. Mans Pfluemer to Rubatex Products, Inc.

Sponge Rubber and process of making same. 2,297,018. Robert L. Overstreet to Salta Corp.

Process for manufacture of organic plastic sheets. 2,296,948. Earle C. Pitman to E. I. du Pont de Nemours & Co.

Nitroglycerin resistant plastic container. 2,296,911. John M. De Bell to Monsanto Chemical Co.

Rubber*

Method of making rubber designs. No. 2,295,735. Victor Hurt to United States Rubber Co.

Method of preserving rubber which comprises incorporating therein thermal reaction product C-alkenyloxy substituted diphenylamine. No. 2,295,753. Philip Paul to United States Rubber Co.

Rubber cement and method of making. No. 2,295,866. Lester Riefenstahl to The General Tire & Rubber Co.

Rubber antioxidants. No. 2,295,985. William Baird and Maldwyn Jones to Imperial Chemical Industries Ltd.

Caoutchouc regeneration. No. 2,296,275. Henry Ghez and Oscar Ghez to "Sud-americana de Patentes."

Manufacture of thin sheets of chemically blown rubber. No. 2,296,305. Dudley Roberts to Rubatex Products.

Deterioration retarder. No. 2,296,363. William Messer to United States Rubber Co.

Process for manufacture of rubber substitute. No. 2,296,464. Robert Brown.

Process of producing rubber deposits from latex emulsion. No. 2,296,513. Eskil Gavatin and Beno Steiger.

Method of preserving rubber. 2,298,881. Carlin Gibbs to The B. F. Goodrich Co.

Method of treating rubber by vulcanizing. 2,298,726. Winfield Scott to Wingfoot Corp.

Method of preparing non-coherent rubber powder. 2,298,713. James Merrill to Wingfoot Corp.

Production of transparent rubber articles. 2,297,787. Peer Locke to The Oak Rubber Co.

Rubber products. 2,297,585. Thomas Shepherd to The Clark Thread Co.

* Continued from last month (Vol. 542, Nos. 3, 4—Vol. 543, Nos. 1, 2, 3).

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Synthetic rubber like composition. 2,297,290. Gaetano F. D'Alelio to General Electric Co.

Process for manufacture of slidable rubber. 2,297,204. Wilhelm Deissner.

Electrical conductor insulation having a high longevous resistance to ozone comprising a body of mixed polymerizates of butadienes and acrylic acid nitrile synthetic rubber compound mechanically and intimately mixed with 10 to 15% by weight of polyvinyl chloride as a filler. 2,297,194. Ernst Badum.

Method preparing rubber coated object which comprises hot galvanizing a ferrous base, electro-depositing a thin layer of metal of the class consisting of nickel and cobalt upon the galvanized surface and vulcanizing a rubber coating thereon. 2,296,837. Elgin C. Domm to National Standard Co.

Textiles*

Process of twist-setting Nylon yarn to reduce twist-liveliness. No. 2,295,593. John Blanchard Miles, Jr. to E. I. du Pont de Nemours & Co.

Process of finishing textiles which comprises padding textile material through aqueous finishing bath having suspended therein emulsified particles of resinous material. No. 2,295,699. William Thackston to Rohm & Haas Co.

Method of producing filaments, fibres, threads and the like having uniform hand and dye affinity from cuprammonium cellulose spinning solutions by the stretch-spinning process. No. 2,295,844. Franz Hoelkeskamp and Ewald Knehe.

Process for making crimped filaments from melt-spinnable, crystalline synthetic linear polymer. No. 2,296,202. Vernal Hardy to E. I. du Pont de Nemours & Co.

Process for manufacture of staple fibre yarns of an elastic and voluminous character. No. 2,296,329. Angus Bell and Joseph Wylde to Celanese Corporation of America.

Process of producing viscose solutions poor in alkali and devoid of free fibres. No. 2,296,378. Richard Bartunek and Johann Stoeckly to North American Rayon Corp.

Process for production of mottled effects on fabrics containing yarns or fibers of organic derivatives of cellulose. No. 2,296,379. Cyril Croft to Celanese Corporation of America.

Manufacture of novelty artificial thermoplastic yarn. No. 2,296,394. Daniel Nelson to E. I. du Pont de Nemours & Co.

Cuprammonium-cellulose solution. No. 2,296,578. Paul Schlosser and Kenneth Gray to Rayonier, Inc.

Method of finishing sheer knitted silk fabric to increase its strength and durability with preservation of texture and appearance. 2,298,841. Robert Pyner and Henry Paulsen to Jasco, Inc.

Method of lubricating and fugitive tinting of yarns composed of or containing organic derivative of cellulose. 2,298,432. Howard Thompson to Eastman Kodak Co.

Textile material comprising organic derivative of cellulose colored with an aminoanthraquinone dye. 2,298,401. James M. Nally and Edgar Jensen to Eastman Kodak Co.

Flexible woven glass fibrous sheet coated and impregnated with a plastic composition. 2,298,295. Charles Hyatt and John Lowman to Columbus Coated Fabrics Corp.

Textile printing process. 2,298,147. Charles Franklin Miller to E. I. du Pont de Nemours & Co.

Process of preparing artificial fibers. 2,298,127. Oskar Huppert to The Glidden Co.

Method of scouring wool. 2,297,986. Ben Rowland and Douglas Fronmuller to The Institute of Paper Chemistry.

Processes rendering textiles water repellent. 2,297,731. Ernst Waltmann and Edgar Wolf to Heberlein Patent Corp.

Process of treating animal fibers. 2,297,703. Gustave Hug and George Linberg to E. I. du Pont de Nemours & Co.

Process of treating animal fibers. 2,297,702. Gustave Hug to E. I. du Pont de Nemours & Co.

Process for dyeing animal fibers. 2,297,701. Gustave Hug to E. I. du Pont de Nemours & Co.

Process of producing viscose rayon. 2,297,613. Heinrich Fink and Gaston Plepp to Walther H. Duisberg.

Process of manufacture of mixed yarns of artificial textile fiber and natural silk threads. 2,297,458. Emilio Como.

Process of insolubilizing protein fibers during their manufacture. 2,297,397. Antonio Ferretti.

Manufacture of artificial silk. 2,297,260. Johann J. Stoeckly and Wolfgang Linnhoff.

Process of steaming textiles. 2,297,230. Hans Langen.

Nitrogenous textile fiber. 2,297,206. Giuseppe Donagemma.

Textile material comprising an artificial yarn impregnated with an ester of an anhydro polyhydric alcohol with a saturated fatty acid having at least 10 carbon atoms. 2,297,135. Isaac P. Davis and Carl Schlatter to American Viscose Corp.

Agricultural Compositions

Processing sugar. No. 2,299,422. Jocob Neuman to United States Patent Development and Royalty Co.

Sugar. No. 2,299,288. Robert Whymper to The National Sugar Refining Co.

Sugar composition. No. 2,299,287. Robert Whymper to The National Sugar Refining Co.

Preservation of green fodder. No. 2,299,745. Otto Hansen to Aktieselskabet Maelkeriet "Enigheden."

Method of treating vegetable phosphatides, dissolved in an oleaginous material. No. 2,299,743. Albert Epstein.

Plant stimulant composition and method. No. 2,300,948. John Lontz to E. I. du Pont de Nemours & Co.

Process for the purification of pectin. No. 3,300,651. Gordon Cole and Homer Holton to California Fruit Growers Exchange.

Solution of water soluble substances from corn steep water. No. 2,302,393, Herman Schopmeyer to American Maize-Products Co.

Cellulose

Treating cellulosic fabrics with strong sulfuric acid of parchmentizing strength containing an aminotriazine. No. 2,299,200. Pierrepont Adams to American Cyanamid Co.

Process for saccharifying cellulose. No. 2,302,022. Mario Giordani and Pietro Leone.

Manufacture of cellulose. No. 2,299,132. Henry Dreyfus to Celanese Corporation of America.

Sheeted cellulosic material coated with a finishing varnish. No. 2,300,373. Frank Stoner, Jr. and Daniel Gray to Stoner-Mudge, Inc.

Boron Fluoride complex as catalyst for the esterification of cellulose. No. 2,300,213. Franklin Flaherty and Ambrose McAlevy to E. I. du Pont de Nemours & Company.

Producing highly stable organic acid esters of cellulose. No. 2,300,180. Ferdinand Schulze to E. I. du Pont de Nemours & Co.

Ceramics

Method of slip casting non-plastic ceramic materials. No. 2,299,374. Fred Bickford to Corning Glass Works.

Opaquing agent for enamels and process for manufacturing same. No. 2,299,764. Maxime Paquet.

Chemical Specialty

Rubber to metal high viscosity lubricant. No. 2,299,139. Corydon Grafton to United States Rubber Co.

Fire and mildew resistant composition and fabric. No. 2,299,612. Edwin Clayton and Lawrence Heffner to Wm. Hooper & Sons Co.

Fungicidal composition. No. 2,299,604. Clarence Weirich to The C. B. Dolge Co.

Purified soap stock prepared from soap stock from the alkali refining of vegetable oils. No. 2,299,603. Benjamin Thurman to Refining, Inc.

Method of increasing the useful life of a solid inorganic adsorbent used in a plurality of contacting operations. No. 2,299,258. Thomas Simpson, John Payne, and Peter Valas to Socony-Vacuum Oil Company, Inc.

Printing ink. No. 2,299,135. Donald Erickson and Paul Thoma to Michigan Research Laboratories, Inc.

Cement in dispersion medium polymerized chloroprene. No. 2,300,352. Roland Earle.

Halogen containing acylaminosulfonic acids with moth-proofing properties. No. 2,299,834. Henry Martin and Rudolf Hirt, and Hans Zaeslin to J. R. Geigy A. G.

Cationic surface active quaternary ammonium perchlorate. No. 2,299,782. Charles Allen and Charles Wilson to Eastman Kodak Company.

Preparing surface modifying agents. No. 2,299,756. Morris Katzman and Benjamin Harris to The Emulsol Corporation.

Abrasive grain. No. 2,301,123. Abraham Klein to Norton Co.

Composition for forming oil-resistant film upon the walls of a paper pulp container or the like. No. 2,301,048. John Holton, Ronald Wilson and Lee Kleinmaier to Pulp Products Co., Inc.

Producing from iron-containing and carbon-containing coal ashes mineral wool substantially free of iron. No. 2,300,930. Raymond Johnson to Anthracite Industries, Inc.

Bactericide, fungicide, and insecticide preparation containing as active constituent a quinone dioximino compound. No. 2,302,384. William ter Horst to United States Rubber Co.

Adhesive which remains flexible and pliable indefinitely regardless of the presence of moisture. No. 2,300,907. Frederick Bronson to The Fibre Can and Machinery Co.

Varnish for printing inks and coatings. No. 2,300,881. Donald Erickson and Paul Thoma to Michigan Research Laboratories, Inc.

Printing ink. No. 2,300,880. Donald Erickson and Paul Thoma to Michigan Research Laboratories, Inc.

Cementing composition comprising a furfuryl silicate, a pulverulent filler and a strong acid hardening agent. No. 2,300,812. John Rust to Montclair Research Corp.

Sulfated oil composition. No. 2,300,780. George Fiero.

Solid perfume. No. 2,300,769. Arthur Berry to Palol Perfumed Products, Inc.

Manufacture of soap. No. 2,300,751. Ashton Scott and Leopold Sender to The Sharples Corp.

Manufacture of soap. No. 2,300,750. Ashton Scott to The Sharples Corp.

Manufacture of soap. No. 2,300,749. Ashton Scott to The Sharples Corporation.

Method of curing glue stock. No. 2,300,740. Edward Christopher to Industrial Patents Corp.

Carroting of animal fiber consisting of aqueous solution containing nitric acid, hydrogen peroxide, and an amino-acid. No. 2,300,662. Constantine Fabian.

Carroting of animal fiber consisting of aqueous solution containing nitric acid, hydrogen peroxide and gelatin. No. 2,300,661. Constantine Fabian.

Aqueous solution for carroting fur comprising perchloric acid, nitric acid, hydrogen peroxide, and water. No. 2,300,660. Constantine Fabian.

Stabilized pyrethrum. No. 2,300,612. Ludwig Christmann and David Jayne, Jr. to American Cyanamid Co.

Stabilized insecticides. No. 2,300,611. Ludwig Christmann and David Jayne, Jr. to American Cyanamid Co.

Surface acetone agent, terpene composition. No. 2,300,599. Donald Sheffield to Hercules Powder Co.

Dibenzyl cyanamide as an insecticide. No. 2,300,588. William Moore to American Cyanamid Co.

Adhesive comprising a partially depolymerised chlorinated polyvinyl chloride and a polyvinyl ether. No. 2,300,587. Adolf Menger to General Aniline & Film Corp.

Mordant having pH value between about 4.8 and 5.1 containing chromium salt and salt of lactic acid. No. 2,300,445. Samuel Weisberg and William Stringer to Sealtest, Inc.

Finely pulverulent agent for treating flour, meal and other like milling products. No. 2,300,439. Gerrit van der Lee.

Non-irritative soap product containing the soaps of fatty acids having at least 12 carbon atoms. No. 2,300,416. Bror Grondal and Harry Wylde to Lever Brothers Company.

Soap and method of making. No. 2,300,413. Kenneth Gaver to The Komel Corporation.

* Continued from last month (Vol. 542, Nos. 3, 4—Vol. 543, Nos. 1, 2, 3).

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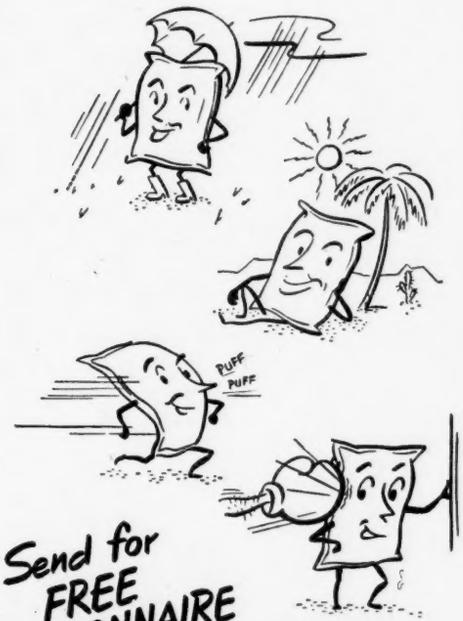

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Lubricant possessing a green fluorescence. No. 2,300,391. Meyer Agruss and George Ayers, Jr. to The Pure Oil Company.
Fertilizer and stimulating agent for plant growth comprising a dialkylstilboestrol compound mixed with a fertilizer salt. No. 2,302,581. Walter Schoeller and Hans Goebel to Schering Corporation.
Insecticidal composition containing an amine having one alkoxyalkylene group. No. 2,302,388. William Hester to Rohm & Haas Company.
Purification of soap nigre by removal of heavy insoluble impurities. No. 2,302,382. Ashton Scott to The Sharples Corp.
Adhesive. No. 2,302,378. Robert Rasmussen.
Filler comprising inert filling material and aqueous solution of water-soluble boric acid-polyhydric alcohol resin. No. 2,302,286. Ernest Almy to Atlas Powder Co.
Insect repellent comprising cyclohexyl caprate. No. 2,302,159. Ludwig Wasum to Kessler Chemical Co.
Wetting agent comprising sulfotolylstearic acid. No. 2,302,070. Alexander Stirton, Robert Peterson, and Philip Groggins.
Soft packing gasket for light weight stampings having a high degree of compressibility. No. 2,301,998. Wilburn Bernstein and Vincent Labrecque to Victor Manufacturing & Gasket Company.
Process of producing oily condensation products having drying oil properties. No. 2,301,952. Helmut Jacobi and Walter Flemming.

Coal Tar Chemicals

Process of treating hydrocarbon gas. No. 2,299,830. Harold Legatski, Will Swerdloff, and Gerald McCullough to Phillips Petroleum Co.
Oxidation of hydrocarbons. No. 2,299,790. Joseph Bludworth to Celanese Corporation of America.
Method of purifying 3-picoline. No. 2,300,741. Francis Cislak and William Wheeler to Reilly Tar & Chemical Corp.
Process of purifying tar acids. No. 2,302,600. Francis Cislak and Arthur Kranzfelder to Reilly Tar & Chemical Corp.

Coatings

Emulsion for coating paper having a continuous phase. No. 2,299,694. Barrett Green to The National Cash Register Co.
Liquid coating for paper consisting of mixture of two emulsions. No. 2,299,693. Barrett Green to The National Cash Register Co.
New composition of matter for coating glass and the like vetrified surfaces. No. 2,299,552. Rob McGregor and Earl Warrick to Corning Glass Works.
Fusible coating composition having imperfect moisture-barrier properties. No. 2,299,144. Clark Heritage and Henry Walter to Wood Conversion Co.
Waxy coating composition suitable for dipping cheese. No. 2,299,951. James Ingle to Industrial Patents Corporation.
Process of applying continuous coating of a fiber-forming synthetic linear polyamide. No. 2,302,332. Robert Leekley to E. I. du Pont de Nemours & Co.
Finishing composition adapted, to give a finish characterized by its brilliance and appearance of depth. No. 2,302,305. Samuel Farrell to Devoe & Raynolds Co., Inc.
Coating cheese with a mixture including wax modified with rubber derivative to provide a resilient flexible enclosing casing. No. 2,302,200. Hubert Fassbender to Milprint, Inc.

Dyes, Stains

Vat dyestuffs and process of preparing same. No. 2,299,142. Herman Hauser and Max Riehen to Society of Chemical Industry in Basle.
Nitrogenous anthraquinone derivative for dyeing vegetable fibers fast yellowish tints. No. 2,299,141. Herman Hauser and Max Riehen to Society of Chemical Industry in Basle.
Vat dyestuffs of the fluoranthene series and process of preparing same. No. 2,299,826. Walter Kern and Theodor Holbro and Richard Tobler to Society of Chemical Industry in Basle.
Tetrakisazo dyestuffs soluble in water. No. 2,300,636. Adolf Sieglitz and Martin Reuter to General Aniline & Film Corp.
Anthrapyridone dyestuffs. No. 2,300,453. Frank Lodge Imperial Chemical Industries, Limited.
Azo dye. No. 2,302,530. Moses Crossley to American Cyanamid Company.

Equipment

Method of and mechanism for classifying finely comminuted material. No. 2,300,324. Richard Thompson to Sturtevant Mill Co.
Apparatus for sampling liquids. No. 2,300,194. Alvin Anderson.
Apparatus for fractional distillation. No. 2,300,985. Reading Smith to Sinclair Refining Co.
Device for purifying lubricating oil and for maintaining therein an effective concentration of an organic addition agent. No. 2,302,552. James Johnson to The Atlantic Refining Company.
Oil reclaiming apparatus. No. 2,302,489. Cleo Brown.
Apparatus for sterilizing, purifying and dehydrating compressed gas. No. 2,302,262. Joseph Schiller.
High vacuum, low temperature drying apparatus. No. 2,302,253. John Reichel.
Gas analysis apparatus means for calibrating a bridge network at any point throughout its range of measurement. No. 2,302,036. Earl Keeler to The Brown Instrument Co.
Method of centering the electron beam of electron-optical apparatus. No. 2,301,987. Bodo von Borries.
Electronic microscope. No. 2,301,975. Ernst Ruska.

Explosives

Explosive charge for oil wells. No. 2,299,907. Walter Lawson and Clifford Woodbury to E. I. du Pont de Nemours & Company.
Propellant explosive charge containing a metallic hydride that decomposes at the temperature of explosion. No. 2,301,043. Charles Hardy to Hardy Metallurgical Co.
Process of treating smokeless powder to reduce its viscosity. No. 2,302,558. William Lewers, Drexel Hill and William Menges, and Earle Pitman to E. I, du Pont de Nemours & Company.

Fine Chemicals

Processes of color photography and compositions and elements therefor. No. 2,299,641. Edmund Middleton and Andrew Jennings to E. I. du Pont de Nemours & Company.
Process of making an amino phenyl anthraquinone. No. 2,299,240. Paul Kranzlein to General Aniline & Film Corp.
Composition capable of inhibiting agglutination or hemolysis in blood. No. 22,208. Ernest Witebsky and Niels Klendshoj to The Buffalo Research Associates, Inc.
Light-polarizing material coated with a photo-sensitive layer. No. 2,299,906. Edwin Land to Polaroid Corporation.
Process of making 2-acetylsulfanilylaminopyridine. No. 2,300,702. George Raiziss to Abbott Laboratories.
N,N′-dimethylene-4,4′-diaminodiphenyl sulfone. No. 2,300,678. Morris Kharasch and Otto Reinmuth to Eli Lilly and Company.
N-(1-carboxyacylaminoethyl thiomethyl) derivatives, and the process of producing them. No. 2,300,676. Morris Kharasch and Otto Reinmuth to Eli Lilly and Company.
N-(1-carboxy-1-acylaminoethyl thiomethyl) and N,N′-bis-(1-carboxy-1-acylaminoethylthiomethyl) derivatives of 4,4′-diaminodiphenyl sulfone, their salts, and the method of producing them and their salts. No. 2,300,677. Morris Kharasch and Otto Reinmuth to Eli Lilly and Company.
Aqueous emulsion of an oil-soluble vitamin. No. 2,300,410. Charles Ferrari to General Mills, Inc.
Manufacture of derivatives of the cyclopentanopolyhydrophenanthrene series. No. 2,302,135. Karl Miescher and Albert Wettstein to Ciba Pharmaceutical Products, Inc.

Industrial Chemicals

Process of preparing magnesia composition suitable for use in the manufacture of molded magnesia products. No. 2,299,721. Walter Perry and Thomas Pond to Johns-Manville Corporation.
Process for production of cyclohexane from naphthenic distillates. No. 2,299,716. Adrianus van Peski to Shell Development Co.
Benzenesulfonamide compounds. No. 2,299,555. Fritz Mietzsch and Karl Bauer to Winthrop Chemical Company, Inc.
Halogenation of an aliphatic conjugated double bond diolefin to a corresponding dihalo mono-olefin. No. 2,299,477. George Hearne and Donald La France to Shell Development Co.
Method of treating bitumina and allied substances of asphaltose character. No. 2,299,469. Ladislao D'Antal to Universal Process Company Ltd.
Process of halogenating a saturated organic compound. No. 2,299,441. William Vaughan and Frederick Rust to Shell Development Co.
Process for desulfurizing alkyl phenols containing sulfur-bearing impurities in the form of thiophenols. No. 2,299,437. Samuel Thomas and William Smith to Shell Development Co.
Method of manufacturing manganese dioxide of high depolarizing capacity from natural pyrolusite. No. 2,299,428. Carlo Rossetti to Leclanche S. A.
Chlorine manufacture. No. 2,299,427. Ludwig Rosenstein to Shell Development Co.
Process for extraction by countercurrently contacting two relatively immiscible liquids. No. 2,299,426. Theodore Rosebaugh to Shell Development Co.
Catalyzed hydrobromination of unsaturated organic compounds. No. 2,299,411. Frederick Rust and William Vaughan to Shell Development Co.
Treatment of enriched benzol wash oil or the like. No. 2,299,283. Adolf Schmalenbach to Koppers Company.
Method for the recovery of highgrade crude from enriched benzol wash oil. No. 2,299,282. Adolf Schmalenbach to Koppers Company.
Production of aminotriazines. No. 2,299,274. William Hill to American Cyanamid Co.
Stabilized diazo biguanide compounds. No. 2,299,245. Paul McClellan and Walter Ericks to American Cyanamid Co.
Stabilized diazo guanylurea compounds. No. 2,299,244. Paul McClellan and Walter Ericks to American Cyanamid Company.
Process of producing high molecular weight heteropolymers of olefins and sulfur dioxide. No. 2,299,223. Frederick Frey, Robert Snow and Walter Schulze to Phillips Petroleum Co.
Process of producing high molecular weight heteropolymers of olefins and sulfur dioxide. No. 2,299,222. Frederick Frey, Robert Snow and Walter Schulze to Phillips Petroleum Co.
Process of producing high molecular weight heteropolymers of olefins and sulfur dioxide. No. 2,299,221. Frederick Frey, Robert Snow and Walter Schulze to Phillips Petroleum Company.
Process of producing high molecular weight heteropolymers of olefins and sulfur dioxide. No. 2,299,220. Frederick Frey, Robert Snow and Walter Schulze to Phillips Petroleum Co.
Substituted aryloxyalkylol sulfides. No. 2,299,213. Elmer Cook and William Thomas, Jr. to American Cyanamid Co.
Vinyl ether. No. 2,299,189. Donald Swan to Eastman Kodak Co.
Method of removing organic sulfur from gases or vapors. No. 2,299,149. William Kemper to Consolidated Gas Electric Light and Power Company of Baltimore.
Composition comprising polymerizable methyl methacrylate and a polymerization inhibitor. No. 2,299,128. Laurence Codd and Frederick Hamblin to Imperial Chemical Industries Ltd.
Chlorinating of compound of dicyandiamide and melamine in presence of alkaline alkali metal compound and sufficient water. No. 2,299,069. Albert Chenicek to Pittsburgh Plate Glass Co.
Process of impermeabilizing, tightening, or consolidating grounds and other earthy and stony masses and structures by oleophile colloid. No. 2,300,325. Gerrit Hendrik van Leeuwen.
Method of phenolating gum accroides. No. 2,300,307. Emil Novotny and George Vogelsang to Durite Plastics, Inc.
Method of producing colloidal lead iodide. No. 2,300,275. Alfred Dinsley to Charles McCarthy.
Process for producing sorbital-containing product by electrolytic reduction of sugars in acid solutions. No. 2,300,218. Ralph Hales to Atlas Powder Co.
Rubber chloride precipitation. No. 2,300,176. James Raynolds to The Raolin Corporation.
Moistureproof material. No. 2,300,168. Arole Olsen to Hercules Powder Co.

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Manufacture of 1, 2, 3-Trichloropropane. No. 2,300,159. Kenneth Laughlin and Cecil Brown to Standard Oil Development Co.

Process for separation of transoestradiol from oestrogenic mixtures. No. 2,300,134. Hans Priewe to Schering Corporation.

Polymer obtained by condensation of naphthenic acid halide. No. 2,300,126. Eugene Lieber to Standard Oil Development Co.

Process for the polymerization of olefins to high molecular weight substances. No. 2,300,069. Arthur Skoglund, to Jasco, Inc.

Mixture of a high molecular weight polymer of an isoolefin. No. 2,300,064. Raphael Rosen, Elizabeth and William Sparks to Jasco, Inc.

Process of producing a butadiene-styrene interpolymer. No. 2,300,056. Helmut Meis and Richard Ludwig to Jasco, Inc.

(Di-aryl) Borates. No. 2,300,006. Ralph Prescott, Robert Dosser and John Sculati to The Dow Chemical Company.

Salt curing composition. No. 2,299,999. Alfred Lippman, Jr. to Bay Chemical Company, Inc.

Electrical treatment of water to reduce effects of hardness thereof. No. 2,299,964. Reginald Crouch.

9, 9 DI-(β-carbamyl-ethyl) fluorene. No. 2,299,948. Herman Bruson to The Resinous Products & Chemical Co.

Preparation of 2-mercaptothiazolines. No. 2,299,938. Bernard Sturgis to E. I. du Pont de Nemours & Company.

Process for preparing mineral filler particles to facilitate bonding with organic binding material. No. 2,299,933. Richard Shaw.

Method for activating finely-divided sulfur compositions. No. 2,299,-917. Forest Minger and Wayne Scoles to The Dow Chemical Company.

Method of preparing cyano diolefines. No. 2,301,131. Joy Lichty to Wingfoot Corporation.

Process of producing peroxidic compounds of fatty acids from natural fats of buttlike consistency containing acids of more than 10 carbon atoms. No. 2,301,124. Vaman Kokatnur and Edward Johnson to Autoxygen, Inc.

Condensation product of naphthol, aldehyde, and dithio acid and method of preparing it. No. 2,301,118. Albert Hardman to Wingfoot Corporation.

Method of preparing normal ferric sulfate. No. 2,301,103. William Wilson and Neil Sargent to Monsanto Chemical Co.

Process for the production of melamine. No. 2,301,053. Rudolf Kohler to The Procter & Gamble Co.

Electrochemical generation of electricity. No. 2,301,022. Henri Dalpayrat.

Thermochemical generation of electricity. No. 2,301,021. Henri Dalpayrat.

Derivatives of tin complex compounds of sulfurized phenols. No. 2,301,002. Werner Zerweck and Heinrich Ritter to General Aniline & Film Corp.

Sulfanilyl alkyl guanidine and process for making it. No. 2,301,-000. Phillip Winnek to American Cyanamid Co.

Aromatic nitrogen-containing hydroxy compounds. No. 2,300,998. Ellis White and Ernest Walters to Shell Development Co.

Mercurated alkyl amides of dibasic phenylene acids and homologues thereof. No. 2,300,992. Donalee Tabern to Abbott Laboratories.

Preparation of methylol compounds of urea or thiourea stable in storage. No. 2,300,976. Hans Scheuermann.

Production of alkinols. No. 2,300,969. Walter Reppe, Herman Spaenig and Karl Locker to General Aniline & Film Corp.

Process for the production of adipic acid and alkyladipic acids. No. 2,300,955. Gerhard Meier.

Interpolymers of vinyl sulfonic acid with another vinyl compound and aqueous emulsions thereof. No. 2,300,920. Werner Heuer to General Aniline & Film Corp.

Cyclic process of recovering and reusing treating agents and materials of a wash liquor used in the cuprammonium method of manufacturing rayon, films, staple. No. 2,300,883. William Furness to American Rayon Co., Inc.

Process for the filtration of molten sulfur. No. 2,300,849. Ernest Tauch, E. I. du Pont de Nemours & Co.

Derivatives of dinaphthoperylenediones. No. 2,300,832. James Ogilvie to Allied Chemical & Dye Corp.

Process of preparing tocopherol-like chroman compounds. No. 2,300,734. Lee Smith to Regents of the University of Minnesota.

Method of dewatering a biological waste sludge containing colloidal matter. No. 2,300,693. Harold Oswald to Oliver United Filters, Inc.

Method of determining the amount of a minor constituent in a mixture of distillable substances. No. 2,299,899. Glen Houghland to The M. W. Kellogg Co.

Process for making vinyl esters from carboxylic acids having at least three carbon atoms. No. 2,299,862. Walter Toussaint and Louis MacDowell, Jr. to Carbide and Carbon Chemicals Corp.

Process for decreasing solubility of water-soluble synthetic linear polyamide article presenting a large surface area. No. 2,299,839. David McQueen to E. I. du Pont de Nemours & Co.

Production of acetone from ethyl alcohol. No. 2,299,806. Henry Dreyfus and Walter Groombridge to Celanese Corporation of America.

Treatment of sugar solutions containing alkaline earth metal salts, the process of inhibiting the formation of scale on surfaces in contact with said solution during evaporation. No. 2,299,783. Marshall Allen.

Production of molded contact masses from precipitated irreversible inorganic gels. No. 2,299,768. Hubert Shabaker to Houdry Process Corp.

Preparation of a steroidal sapogenin derivative. No. 2,299,759. Russell Marker to Parke, Davis & Company.

Preparation of steroidal sapogenin derivatives. No. 2,299,758. Russell Marker to Parke, Davis & Company.

Control of calcium carbonate deposition for corrosion inhibition. No. 2,299,748. George Hatch to Hall Laboratories, Inc.

Process for preparing phosgene oxime. No. 2,299,742. Philip Ehman and Walter Walker to Ansul Chemical Co.

Plasticized vinyl compound. No. 2,299,741. Gaetano D'Alelio to General Electric Company.

Copolymerization product of vinyl halides and nuclearly halogenated arylalkanol esters of acrylic acid. No. 2,299,740. Gaetano D'Alelio to General Electric Co.

Process for the recovery of glycerol from still residues from fermentation processes. No. 22,213. Robert Walmesley to Imperial Chemical Industries, Ltd.

Process of producing butene-2-diol-1,4 and its substitution products. No. 2,300,598. Richard Schnabel and Willi Schmidt, and Kurt Heintz to General Aniline & Film Corp.

Ethyl n-amyl cyanamide. No. 2,300,597. Richard Roblink, Jr. to American Cyanamid Company.

Conditioning of drilling muds. No. 2,300,590. Jolly O'Brien.

Phthalocyanine sulfonic acid amides. No. 2,300,572. Hans Hoyer and Otto Bayer, and Friedrich Nadler to General Aniline & Film Corp.

Method of preparing alkylol cyanamide condensation products. No. 2,300,570. Ralph Heuser and Walter Ericks to American Cyanamid Co.

Preparing fine-grained and pearl-like polymerization products. No. 2,300,566. Hans-Joachim Hahn and Ernst Braun to General Aniline & Film Corp.

Process of sterilizing and purifying water. No. 2,300,564. Earl Godfrey to Joseph A. Rossi.

Amino polyglycol ether. No. 2,300,556. Melvin De Groote and Bernhard Keiser to Petrolite Corporation, Ltd.

Specimen embedded in a solid transparent condensation product of maleic anhydride and styrene. No. 2,300,495. Howard Gerhart to Pittsburgh Plate Glass Company.

Coloration of artificial materials. No. 2,300,472. Percy Sowter and Reuben Betteridge to Celanese Corporation of America.

High melting stable polyhydric alcohol ester of a nuclearly hydrogenated polymerized rosin. No. 2,300,433. Robert Palmer to Newport Industries, Inc.

Process for making dichloroalkyl ethers which comprises treating alkylene chlorhydrins with chlorine and olefines. No. 22,217. Granville Perkins to Carbide and Carbon Chemicals Corp.

Process of preparing a homologous mixture of heterocyclic secondary amines. No. 2,302,655. John Rutherford to Standard Oil Company of California.

Cyclid acetals of ketosteroids and a method of making the same. No. 2,302,636. Heinrich Koster and Hans Inhoffen to Schering Corporation.

Polymerization of rosin and rosin esters. No. 2,302,632. Irvin Humphrey to Hercules Powder Co.

Polymerization of rosin and rosin esters. No. 2,302,577. Alfred Rummelsburg to Hercules Powder Company.

Polymerization of rosin and rosin esters. No. 2,302,576. Alfred Rummelsburg to Hercules Powder Co.

Process for the preparation of oxygenated organic compounds. No. 2,302,618. Donald Loder to E. I. du Pont de Nemours & Company.

Process for seasoning moisture-containing wood. No. 2,302,611. Hamline Kvalnes to E. I. du Pont de Nemours & Co.

Azeotropic distillation. No. 2,302,608. Edmund Field to E. I. du Pont de Nemours & Company.

Treatment of water by introducing water-soluble salt of a hydroxynitrilosulfonic acid. No. 2,302,598. Walter Bruner to E. I. du Pont de Nemours & Company.

Process for seasoning moisture-containing wood. No. 2,302,594. Julius Berliner and Hamline Kvalnes to E. I. du Pont de Nemours & Company.

Carbohydrates and process of modifying the absorbability thereof. No. 2,302,511. Roger Wallach to Sylvania Industrial Corp.

Process of oxidizing a mixture of a cymene and a menthane and products therefrom. No. 2,302,467. Robert Palmer, Carlisle Bibb and William McDuffee, Jr. to Newport Industries, Inc.

Process of oxidizing cymenes. No. 2,302,466. Robert Palmer and Carlisle Bibb to Newport Industries, Inc.

Method of preparing the oxidation products of alkylated benzene and cyclohenane compounds. No. 2,302,465. Robert Palmer and Carlisle Bibb to Newport Industries, Inc.

Styrene polymerization products. No. 2,302,464. Robert Palmer, Carlisle Bibb, and William McDuffee, Jr. to Newport Industries, Inc.

Process of oxidizing menthanes. No. 2,302,463. Robert Palmer, Carlisle Bibb and William McDuffee, Jr. to Newport Industries, Inc.

Process of preparing cumic acid. No. 2,302,462. Robert Palmer and Carlisle Bibb to Newport Industries, Inc.

Method of polymerizing 2-chlorobutadiene-1,3. No. 2,302,445. Siegfried Kiesskalt, Wilhelm Schatch and Karl Winnacker.

Cleansing and cooling gases by liquid in the manufacture of water gas. No. 2,302,396. Joseph Smith to Humphreys & Glasgow, Ltd.

Stabilization of halogen containing organic materials. No. 2,302,362. Johannes Nelles and Otto Bayer.

Alkali treatment of heads derived in the distillation of alcohol to recover a high proof spirit. No. 2,302,246. George Pohler to Joseph Seagram & Sons, Inc.

Production of alcohols of the acetylene series. No. 2,302,345. Otto Pesta and Friedrich Ebel to General Aniline & Film Corporation.

Nitric acid esters of monoacyl glycerines and their production. No. 2,302,324. Helmut Jacobi and Walter Flemming.

Process for the production of the dilactone of gamma ketopimelic acid. No. 2,302,321. Heinrich Hopff and Herbert Griesshaber.

Stabilized partially hydrolized starch pastes. No. 2,302,310. Sivert Glarum and Joseph Thomas to Rohm & Haas Co.

Stabilization of wet processed starch pastes with urea-formaldehyde. No. 2,302,309. Sivert Glarum and Joseph Thomas to Rohm & Haas Company.

Process of separating phenylphenols from an alkaline solution. No. 2,302,294. Kurt Buchelm.

Polyethylene ureas. No. 2,302,288. Herbert Bestian.

Method of chlorination with sulfuryl chloride and production of monochloro-trimethyl acetic acid. No. 2,302,228. Morris Kharasch and Herbert Brown to E. I. du Pont de Nemours & Co.

Process for the manufacture and purification of uric acid. No. 2,302,-204. Howard Gable and Joseph Bloodsworth to Joseph Bloodsworth.

Process for producing guanamine derivatives. No. 2,302,162. Werner Zewweck and Walter Brunner.

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Process for production of fuel gas of high calorific value from dusty or finely granular fuels. No. 2,302,157. Friedrich Totzek to Koppers Company.

Apparatus for producing fuel gas of high calorific value from dusty or granular solid carbonaceous fuel. No. 2,302,156. Friedrich Totzek to Koppers Company.

Method and apparatus for producing gaseous and liquid carbon dioxide and dry ice. No. 2,302,136. Ogden Minton to Neva Minton.

Ethers of aliphatic polyhydroxy substances, free of ester linkages. No. 2,302,121. Benjamin Harris.

Process for stabilizing calcium tetracuproxy chloride against dissociation by water and inhibiting the consequent formation of water-soluble copper upon drying a water dispersion thereof. No. 2,302,103. Fred Carlson and Robert Pfanstiel to E. I. du Pont de Nemours & Company.

Process for the manufacture of amylolytic enzymes by cultivating micro-organisms. No. 2,302,079. Rudolf Waldmann.

Printing plate and printing unit made from superpolyurethanes. No. 2,302,037. Leo Koliek.

Process of producing N-phenyl 2-amino butadienes 1,3. No. 2,301,971. Walter Reppe and Otto Hecht and Ernst Gassenmeier.

Monoamides of polycarboxylic acids. No. 2,301,969. Walter Pinkernelle.

Method of preparing lactams. No. 2,301,964. Elmore Martin to E. I. du Pont de Nemours & Co.

Moistureproof sheet wrapping material. No. 2,301,959. Daniel Lanning to E. I. du Pont de Nemours & Co.

Chlorination of butadiene and copolymers thereof. No. 2,301,925. Sidney Benjamin.

Leather

Process for making artificial leather products from fabrics having a calendar coat of unvulcanized rubber. No. 2,302,557. Carl Langkammerer to E. I. du Pont de Nemours & Company.

Metals, Alloys

Lead alloy. No. 2,299,712. Horace Gillett to Battelle Memorial Institute.

Lead alloy. No. 2,299,711. Horace Gillett to Battelle Memorial Institute.

Hardenable steel heat treatment. No. 2,299,685. Harold Elmendorf to United States Steel Corporation of Delaware.

Method of removing hydrogen embrittlement from ferrous bodies. No. 2,299,639. James McElhaney to Carnegie-Illinois Steel Corp.

Process of building up chromium and chromium alloys and for preparing electrodes therefor. No. 2,299,483. Heinrich Lubbe and Erich Kruppa.

Fused salt bath for surface hardening high speed steel articles. No. 2,299,186. Haig Solakian and Louis Sarvis.

Brazing light metals. No. 2,299,168. Mike Miller to Aluminum Company of America.

Brazing light metals. No. 2,299,167. Mike Miller to Aluminum Company of America.

Brazing light metals. No. 2,299,166. Mike Miller to Aluminum Company of America.

Brazing light metals. No. 2,299,165. Mike Miller to Aluminum Company of America.

Brazing light metals. No. 2,299,164. Mike Miller to Aluminum Company of America.

Case hardening stainless steel in dissociated ammonia and methane. No. 2,299,138. John Gier, Jr. to Westinghouse Electric & Manufacturing Co.

Alloy of platinum, palladium, and silver. No. 2,299,114. Cecil Sivil and Edward Liebig to Baker & Company.

Process for prevention of discoloration of clear lacquer compositions used for dipping copper and copper material. No. 2,299,096. Joseph Krieger.

Production of hard metal alloys, especially for tools. No. 22,207. Paul Schwarzkopf to The American Cutting Alloys, Inc.

Production of carbides and ferroalloys by smelting a suitable charge in an electric furnace. No. 2,300,355. Tonnes Ellefsen.

Magnetic alloy of iron and aluminum. No. 2,300,336. Richard Bozorth and Howell Williams to Bell Telephone Laboratories, Inc.

Process for annealing austinitic chromium-nickel alloy steel. No. 2,300,274. Otto Dahl and Franz Pawlek to General Electric Co.

Method of remelting relatively fine particles of scrap metal. No. 2,300,141. Raymond Whitzel to Aluminum Company of America.

Process for the concentration of phosphate ore containing silica. No. 2,299,893. Ernest Greene to Phosphate Recovery Corp.

Chromium alloy adapted for cutting tools. No. 2,299,871. Charles Baird to Crobalt, Inc.

Hard, high-tensile strength alloy suitable for high speed cutting tools. No. 2,301,082. Charles Schafer.

Method for treating mercury mines. No. 2,300,965. Merle Randall.

Process of alloying tungsten with ferrous metals. No. 2,300,944. Arthur Linz to Climax Molybdenum Co.

Process of alloying molybdenum with ferrous metals. No. 2,300,943. Arthur Linz to Climax Molybdenum Co.

Process for refining lead. No. 2,300,939. Yurii Lebedeff to American Smelting and Refining Co.

Process for removing iron compounds from non-ferrous catalysts. No. 2,300,878. Harry Drennan and John Hillyer to Phillips Petroleum Co.

Recovery of phosphate ore values by froth flotation processes. No. 2,300,827. Ludwig Christmann and Stephen Erickson to American Cyanamid Co.

Lead base alloy and cable sheath composed thereof. No. 2,300,788. Gunnard Johnson and William Bassett, Jr. to Anaconda Wire and Cable Co.

Refractory brick comprising clay, and alumina, iron, graphite and carborundum in about equal proportions. No. 2,300,683. John McClaskey.

Electrical contact alloys. No. 2,300,558. Frank Driggs to Fansteel Metallurgical Corp.

Heat corrosion resistant metallic material. No. 2,300,400. Rea Axline to Metallizing Engineering Co., Inc.

Method and composition for treating metals. No. 2,302,643. John Thompson to Parker Rust Proof Co.

Briquette for the addition of tungsten to ferrous alloys. No. 2,302,616. Arthur Linz to Climax Molybdenum Co.

Briquette for the addition of molybdenum to ferrous alloys. No. 2,302,615. Arthur Linz to Climax Molybdenum Co.

Addition agent for augmenting the nitrogen content of steel. No. 2,302,607. Samuel Epstein to Bethlehem Steel Co.

Fused bath electrolytic production of ferrochromium. No. 2,302,604. Clinton Dolbear to Alexander W. Reid, Clinton E. Dolbear, and Lloyd Veitch.

Material and method for cleaning and coating metal. No. 2,302,510. Robert Tanner and Herman Lodeesen to Parker Rust Proof Company.

Froth flotation. No. 2,302,338. August Moeller and Ernst Wagner.

Method of treating a ferrous metal surface. No. 2,301,983. Robert Tanner to Parker Rust Proof Co.

Heat treatment of ferrous metals. No. 2,301,932. Leslie Delancey.

Paint, Pigments

Finishing varnish for application to decorated metal sheet. No. 2,299,433. Frank Stoner, Jr. and Daniel Gray to Stoner-Mudge, Inc.

Process of making composite pigments of lithopone, cadmium lithopone and cadmium-zinc lithopone. No. 2,299,170. Kenneth Mowlds to The Glidden Co.

Process of making extended pigment with improved tinting strength. No. 2,299,169. Kenneth Mowlds to The Glidden Company.

Process of treating calcined titanium dioxide to increase its resistance to discoloration. No. 2,299,120. Benjamin Wilson to American Zirconium Corp.

Manufacture of selenium red pigments. No. 2,300,196. Abe Bozarth to The Harshaw Chemical Co.

Method of increasing production in the grinding of pigment pastes. No. 2,301,143. Leo Roon and Arthur Minich to Nuodex Products Co., Inc.

Composition for speeding up the making of pigment pastes. No. 2,301,142. Leo Roon and Arthur Minich to Nuodex Products Co., Inc.

Producing a chlorine free pigment of the copper phthalocyanine type. No. 2,302,612. Harold Lacey to American Cyanamid Co.

Paper and Pulp

Process of producing cellulose pulp from highly resinous wood such as Southern pine. No. 2,300,733. Lyly Sheldon to The Cellulose Research Corp.

Activation of leather refuse having an ash content in excess of 3%. No. 2,300,600. James Steely, Roy Swartz, and Smitry Troubs to West Virginia Pulp and Paper Company.

Petroleum

Paraffin wax composition and method of producing same. No. 2,299,306. Mead Cornell to The Cornell Machine Co.

Manufacture of high antiknock hydrocarbons. No. 22,205. Arthur Goldsby to The Texas Company.

New Petroleum product. No. 2,300,291. Samuel Jolly to Sun Oil Company.

Process and apparatus for dewaxing oil. No. 2,300,283. Harmon Fisher to Union Oil Company of California.

Process for producing high antiknock motor fuel fraction from substantially saturated naphtha rich in straight chain paraffin hydrocarbons. No. 2,300,249. Bernard Evering and Edmond d'Ouville to Standard Oil Company.

Lubricant. No. 2,300,131. Louis Mikeska to Standard Oil Development Co.

Process for stabilizing olefin-containing hydrocarbon oil against deterioration. No. 2,300,246. Joseph Chenicek and Robert Rosenwald to Universal Oil Products Co.

Conversion of hydrocarbons. No. 2,300,240. Charles Thomas to Universal Oil Products Company.

Isomerization of paraffins in presence of hydrogen chloride and an isomerizing catalyst. No. 2,300,235. Herman Pines and Herman Bloch to Universal Oil Products Co.

Isomerization of normal paraffins. No. 2,300,160. Kenneth Laughlin to Standard Oil Development Co.

Distillation of petroleum oils containing salts of hydrochloric acid. No. 2,300,158. Minor Jones to Standard Oil Development Co.

Catalytically converting relatively high boiling hydrocarbons into products of lower boiling range. No. 2,300,152. Charles Hemminger to Standard Oil Development Co.

Process for catalytic conversion of hydrocarbon oils. No. 2,300,151. Charles Hemminger to Standard Oil Development Company.

Process for polymerization of olefins into liquid hydrocarbons suitable as motor fuels. No. 2,300,123. Emil Keunecke and Wilhelm Muench.

Process for cracking oils. No. 2,300,106. Gerald Connolly to Standard Oil Development Co.

Process for resolving petroleum emulsions of the water-in-oil type. No. 2,300,103. Edwin Claytor to Petrolite Corporation, Ltd.

Process for converting hydrocarbon oil into high yields of substantially olefin-free gasoline. No. 2,300,033. Louis Kassel to Universal Oil Products Co.

Continuous catalytic process for converting normally liquid hydrocarbons into high yields of desirable products including olefin-free high antiknock distillate for use in aviation fuel. No. 2,300,032. Louis Kassel to Universal Oil Products Co.

Catalytic cracking of hydrocarbons. No. 2,300,031. Wayne Benedict to Universal Oil Products Company.

Method of converting low boiling straight chain oxygenated derivatives of normal aliphatic hydrocarbons into higher boiling isoaliphatic compounds of higher anti-knock value. No. 2,299,844. Ernest Ocon.

Process for producing a motor fuel mixture of highly branched chain amylenes. No. 2,299,801. Paul Cramer to General Motors Corporation.

Lubricating oil. No. 2,299,755. Samuel Jolly to Sun Oil Company.

Abstracts of Foreign Patents

Collected from Original Sources and Edited

Those making use of this summary should keep in mind the following facts:

Belgian and Canadian patents are not printed. Photostats of the former and certified typewritten copies of the latter may be obtained from the respective Patent Offices.

English *Complete Specifications Accepted* and French patents are printed, and copies may be obtained from the respective Patent Offices.

In spite of present conditions, copies of all patents reported are obtainable, and will be supplied at reasonable cost.

This digest presents the latest available data, but reflects the usual delays in transportation and printing. Your comments and criticisms will be appreciated.

CANADIAN PATENTS

Granted and Published October 28, 1941
(Continued from last month)

A hydrogenated di-naphthyl ether resin. No. 400,324. Merck & Co., Inc. (Karl Folkers).

Purifying impure synthetic co-carboxylase containing large amounts of unreacted vitamin B_1 by treating an aqueous neutral solution of said impure synthetic co-carboxylase with a soluble silver salt. No. 400,325. Merck & Co., Inc. (John Weijlard).

Removing phosphorus and arsenic compounds from alkali metal vanadate solutions by treating the alkali metal vanadate solution with calcium vanadate so as to precipitate the arsenates and phosphates present in the form of the corresponding insoluble calcium compounds. No. 400,327. I. G. Farbenindustrie A.G. (Kurt Schneider).

Magnesium alloy containing, in per cent, 2-6 bismuth, 0.5-3 cadmium, 1-5 aluminum, 1-3.5 zinc, the balance magnesium. No. 400,328. Georg Von Giesche's Erben. (Arthur Burkhardt and Richard Knabe).

Apparatus for the clarification or filtration of cyanide solutions. No. 400,468. The Merrill Company. (Louis L. Mills and Thomas B. Crowe).

Method for treatment and precipitation of alkaline-cyanide solutions containing dissolved precious metals. No. 400,469. The Merrill Company. (Louis D. Mills and Thomas B. Crowe).

Process for inhibiting discoloration of salt of a heavy metal and an organic acid selected from the group consisting of aliphatic and alicyclic monocarboxylic acids containing at least 7 carbon atoms. No. 400,490. Shell Development Company. (Mihai Bogdan).

Restoring the efficiency of a thin bed of catalyst granules employed as a catalyst for the oxidation of ammonia by passing ammonia and oxygen-containing gas through the bed. No. 400,492. The Solvay Process Company. (Vernon M. Stove).

Bituminous composition comprising a bitumen, a bitumen soluble metal soap and an acidic derivative of the bitumen, obtained by maintaining the bitumen and the metal soap at a temperature between 210° and 350° F. for five days. No. 400,494. Standard Oil Development Company. (Emile L. Baldeschwielder).

Extraction of lubricating oil with phenol. No. 400,495. Standard Oil Development Company. (Chester L. Read).

Marking edible carcasses or portions thereof from which the skin has been removed by applying thereto a strip of moistened glassine paper bearing identifying marks. No. 400,500. Swift and Company. (Beverly E. Williams).

Marking edible carcasses from which skins have been removed by applying to the moist surface of freshly skinned carcasses a laminated strip of paper and transparent cellulose bearing identifying marks, the paper side of the laminated strip being placed against the meat. No. 400,501. Swift and Company. (Beverly E. Williams).

Method of making anhydrous crystalline zirconium oxide from zirconium silicate or zircon. No. 400,512. The Titanium Alloy Manufacturing Company. (Charles J. Kinzie and Donald S. Hake).

Plastic bearing containing an infusible phenolic condensation product, and a filler molded therewith capable after molding of absorbing a lubricant body. No. 400,513. Trico Products Corporation. (Roy C. Timm).

Treating cast iron containing 3.0–3.6% carbon by heating it to a temperature above its critical temperature for about 15–20 minutes, then quenching the iron in a bath maintained at a temperature of about 600° F. for about 15–30 minutes, and then cooling the iron to room temperature. No. 400,520. United Shoe Machinery Company of Canada Limited. (Edward L. Bartholomew and John D. Paine, Jr.).

Treating articles by setting up an electrostatic field between electrodes positioned side by side, said field being unaccompanied by a corona discharge, and subjecting the articles to be treated to the stray field from said electrodes by moving the article in a path outside the electrodes without permitting them to enter the space between electrodes. No. 400,521. United Shoe Machinery Company of Canada Limited. (George T. Hart, Jr. and Erastus E. Winkley).

A tape in roll form comprising a flexible strip of porous fibrous material having a filling of vulcanized rubber, a coextensive coating of pressure sensitive rubber base adhesive on one face of the strip, and a separator coat formed for the most part of ethyl cellulose and extending over and bonded to the other face of the strip. No. 400,526. Van Cleef Bros. (Paul Van Cleef).

A perfume containing as a constituent a ketal of pyrocatechol. No. 400,530. Winthrop Chemical Company, Inc. (Albert Weissenborn).

Process for the production of artificial silk fabrics having an improved extensibility. No. 400,534. Henry Dreyfus. (Albert Mellor).

Process for the stabilization of organic esters of cellulose and for the production of cellulose acetate. No. 400,535. Camille Dreyfus. (Herbert E. Martin).

Method of obtaining the adrenal cortical hormone from aqueous extracts containing it together with impurities of the order of lipide-like substances and adrenaline. No. 400,541. Chemische Fabrik Promonta G. M. b. H. (Alois Detzel).

Electrolytic process for producing nitrogen trichloride. No. 400,542. Naamlooze Vennootschap Industrieele Maatschappij vorheen Noury & van der Lande. (Gerrit van der Lee).

Producing nitrogen trichloride by electrolysis on an aqueous solution containing ammonium and chloride ions and free acid. No. 404,543. N. V. Industrieele Mij. voorheen Noury & van der Lande. (Erich Staudt).

Process comprising causing butyldodecylamine to react with diglycolic anhydride. No. 400,544. Ludwig Orthner, Carl Platz, Hans Keller and Heinz Sönke.

Production of valuable hydrocarbon products from liquid, semi-solid or fusible distillable carbonaceous materials which contain asphaltic substances. No. 400,546. N. Y. Internationale Hydrogeneering-soctrooien Mij. (Mathias Pier and Walter Kroenig).

Process for the extraction under pressure or the destructive hydrogenation of solid carbonaceous materials. No. 400,547. N. V. Internationale Hydrogeneeringsoctrooien Bij. (Walter Kroenig).

Apparatus for the manufacture of shaped products such as threads, bands, films, flexible tubes and the like from solutions or plastics masses. No. 400,333. Walter Freudenberg, Hans Freudenberg, Otto Freudenberg and Richard Freudenberg. (Hans Freudenberg and Emil Freudenberg).

Process for producing azo dyestuffs on the fiber. No. 400,334. Wolfgang Alt and Hans Krzikalla.

Process of color developing a multilayer material, the several emulsion layers containing color formers and the yellow layers carrying colloidal silver, which comprises conducting the color development in the presence of an organic hydrazine compound. No. 400,336. Edith Weyde and Erwin Trabert.

Photographic material comprising a lightsensitive silver halide emulsion layer which contains a color former for blue-green and as a sensitizer a dyestuff of the pinacyanol series having two methyl groups as substituents in any position of each benzene ring. No. 400,337. Gustav Wilmanns and Oskar Riester.

A silver halide emulsion containing a color forming development component fast to diffuse, said component containing at least one substituent having a chain of the general formula $(—A—X—)_n$ wherein A is alkylene, X is a heterogroup selected from the class consisting of —O—, —NR—, and —S—, R being H, alkyl, and n is at least 5. No. 400,338. Wilhelm Schneider and Alfred Frölich.

Method of degassing liquids or fused masses by sound waves, characterized by the fact that the frequencies of the sound waves lie within the audible range, or between 20 and 20,000 cycles. No. 400,339. Friedrich Kruger.

Dye compositions comprising ice-color coupling components, diazoamino compounds, which contain acids, salt forming solubilizing groups in the radicals attached to the amino nitrogen and can be split off into the diazo compounds and the amines by reducing the alkalinity of the preparations, in the form of alkali metal salts, and volatile oxygen-containing, water-soluble organic bases, coupling compounds and diazoamine compounds being dissolved in said bases. No. 400,348. Albert Schmelzer.

Granted and Published November 4, 1941.

Electrolytic process of producing protective coating on the exposed metallic parts of ships' bottoms and other submerged structures. No. 400,356. George C. Cox.

Foreign Chemical Patents

Canadian Patents—p. 89

Manufacturing threads of regenerated cellulose filaments ready for fabric forming operations by subjecting thread of regenerated cellulose filaments to the action of heat and, as the final twisting operation and while the thread is hot, inserting twist to a degree insufficient to impart creping power to the thread. No. 400,359. Henry Dreyfus.

Process in the manufacture of paper, cellulose, ground woodpulp, carton and other fiber products consisting of adding an aluminum compound to the white water having a pH value between 4 and 6 and adding a sufficient amount of a sulfonated oil to said white water in the presence of said metallic compound for flocculating the solid particles in said water to enable the reclaiming thereof for reuse. No. 400,365. Adolf Mgnus Rupert Karlström.

Copper-base alloy comprising 1-4% silicon, 0.005-0.5% boron, and the balance substantially all copper. No. 400,391. The American Brass Company. (Horace F. Silliman).

Process for the coating of ferrous metal bodies with molten zinc and aluminum without the use of flux. No. 400,399. Armzen Company. (Tadeusz Sendzimir).

Treating a resin oil by fractionating it to separate low-boiling color-forming bodies as distillate and thereafter distilling the oil to separate high-boiling color-forming bodies as residue while maintaining the still below the temperature at which said high-boiling color-forming bodies decompose. No. 400,403. The Barrett Company. (Edwin L. Cline).

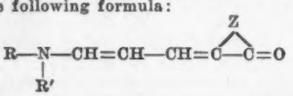
Nickel-chromium alloy comprising 10-30% chromium, from 0.01 to 2% thorium, from 0.25 to 3% silicon and the balance nickel. No. 400,405. British Driver-Harris Company Limited. (William M. Kay).

Employing stainless steel in conjunction with active chlorine without attacking the steel by applying a persulfate to the steel for a time and at a temperature sufficient to render the surface of the steel inactive to active chlorine, and thereafter bringing the steel in contact with the solution containing active chlorine. No. 400,406. Buffalo Electro-Chemical Company, Inc. (Hans O. Kauffmann and Robert L. McEwen).

Producing photographic color separation records from a colored original by scanning elemental areas of the original, simultaneously directing different spectral components of the scanning beam as modified by the original onto corresponding areas of different photographic layers, altering the intensity of at least one of said components in accordance with the intensity of at least one other of said components, and developing the exposed photographic layers. No. 400,407. Canadian Kodak Company Limited. (Alexander Murray and Richard S. Morse).

Cyanine dye in which at least one of the two alkyl groups attached to the two cyanine nitrogen atoms is a hydroxyalkyl group. No. 400,408. Canadian Kodak Company Limited. (Leslie G. S. Booker and Lloyd A. Smith).

Process of preparing a dye comprising reacting from about one and one-half to about three molecular proportions of piperidine with a compound of the following formula:



wherein R represents an acetyl group, R′ represents a phenyl group and Z represents the nonmetallic atoms necessary to complete a 2-thiohydantoin nucleus. No. 400,409. Canadian Kodak Company Limited. (Grafton H. Keyes).

Hard rubber article having a strongly adherent and resistant rubber-free surface coating thereon, essentially comprising a vinyl resin substantially identical with a resin resulting from the conjoint polymerization of vinyl chloride and vinyl acetate, together with a compound of lead, said coating being bonded to the hard rubber surface by baking at a temperature above 275° F. No. 400,428. Carbide and Carbon Chemicals Limited. (Arthur K. Doolittle).

Extraction apparatus comprising the combination of a mixing vessel, means for introducing solid material and a solvent into said mixing vessel, agitating means in said mixing vessel for making a flowable mixture of said material and solvent, a settling vessel, a pipe leading from the settling vessel for discharge of solvent and extractives, a weir between the mixing vessel and the settling vessel over which said flowable mixture is caused to flow from the mixing vessel to the settling vessel, said settling vessel having a sloping bottom, and a drag belt for dragging settled solid material up said sloping bottom and discharging the same from the settling vessel. No. 400,437. Corn Products Refining Company. (Lloyd C. Swallen and Harold Reintjes).

Making porcelain articles by mixing finely divided porcelain with a chemically setting binder, compacting the mixture of chemical setting binder and finely divided porcelain in a flexible mold to the form of a firm body by prolonged vibration and allowing same to set, removing the firm body from the mold by flexing the mold, and then fire-hardening said body. No. 400,438. Dental Research Corporation. (Reiner W. Erdle).

Purifying a substance of the class of animal and vegetable oils, fats, and waxes, and concentrated soluble in fat vitamin fractions thereof, by extracting the impurities from the material to be treated by contacting the material with an aldehyde having a furane nucleus. No. 400,439. Distillation Products, Inc. (Arthur O. Tischer).

Improving the adhesion of rubber to cotton by initially dewaxing the cotton and subsequently applying to the treated article an adhesive in the form of a mixture of an aqueous dispersion of rubber and resorcinol resin. No. 400,440. Dunlop Tire and Rubber Goods Company Limited. (Evelyn W. Madge and Edward A. Murphy).

Vulcanized rubber articles of reduced combustibility in which are incorporated a halogenated organic compound and at least one material selected from boric acid, phosphoric acid and easily fusible heat resistant compounds of boric acid, phosphoric acid and sulfuric acid. No. 400,441. Dunlop Tires and Rubber Goods Company Limited. (Douglas F. Twiss, Ian Kemp and Frederick W. Warren).

Producing composite articles of rubber and fabric comprising forming a vulcanizable adhesive by mixing together dry rubber, sulfur and vulcanizing agents together with a small proportion of an aldehyde or ketone, treating said fabric with said adhesive and bonding said treated fabric with rubber by vulcanization. No. 400,442. Dunlop Tire and Rubber Goods Company Limited. (James Haworth).

Wicking material for use with combustible fluids comprising glass filaments woven into a textile fabric, each of said filaments being coated with an adherent layer of organic material. No. 400,448. Fiberglas Canada Limited. (Erroll B. Shand).

Correcting the color values in printing from a subtractive multicolor picture onto a color-photographic light sensitive element by changing the composition of the printing light. No. 400,449. General Aniline & Film Corporation. (Wilhelm Schneider).

Increasing the productivity of wells having a producing formation of at least some permeability by injecting under pressure into the permeable producing formation a liquid explosive capable of enlarging the channels leading to the well, and detonating said explosive. No. 400,450. Gulf Research & Development Company. (Harvey T. Kennedy).

Soap composition comprising kettle soap and sodium silicate, the ration of silicate to soap being at least 4 to 10, an organic water soluble colloidal dispersing agent in quantity sufficient to make soap and silicate compatible, and a sudsing material selected from the group consisting of sodium hexametaphosphate, said sudsing material being present in sufficient quantity to induce normal sudsing of said composition. No. 400,451. Harris Soap Company. (John B. Curzon).

Preparing a concentrated liquid egg white by beating egg whites into a foam, drying the foam, subdividing the foam to form a dried product, dissolving the dried product in liquid egg white, and maintaining the concentrated liquid egg white at refrigerator temperatures. No. 400,460. Industrial Patents Corporation. (Clinton H. Parsons and Leon D. Mink).

Method of condensing magnesium vapor from mixtures thereof under conditions in which the partial pressure of magnesium vapor in equilibrium with the magnesium at its solidification temperature is numerically an appreciable fraction of the partial pressure of magnesium vapor in the inert atmosphere of the condensing system. No. 400,464. Magnesium Metal Corporation Limited. (Konrad Erdmann).

Producing briquettes from the magnesium-containing dust accruing in the electro thermal production of magnesium from magnesium oxide with carbon. No. 400,465. Magnesium Metal Corporation Limited. (Konrad Erdmann).

Electrolytic cell having a mercury-amalgam electrode. No. 400,466. The Mathieson Alkali Works. (Chester N. Richardson).